RAILROAD GAZETTE

FRIDAY, JUNE 14, 1878.

Form, Proportion and Materials for Locomotive Boilers.

[Report of Committee of the Master Mechanics' Association, presented at the Eleventh Annual Convention, in Richmond, Va., May 14, 1878.]

To the American Railway Master Mechanics' Association:

GENTLEMEN: At your last annual convention, held in St. Louis, May 15 and 16, 1877, it was deemed proper to continue the above-named committee, and we were instructed to make further investigation on the subject of the best form, proportion and material for locomotive boilers, and to report the result of such investigation to the Association at its next annual meeting.

Your committee held a meeting and adopted a circular, asking such questions as we thought might elicit information

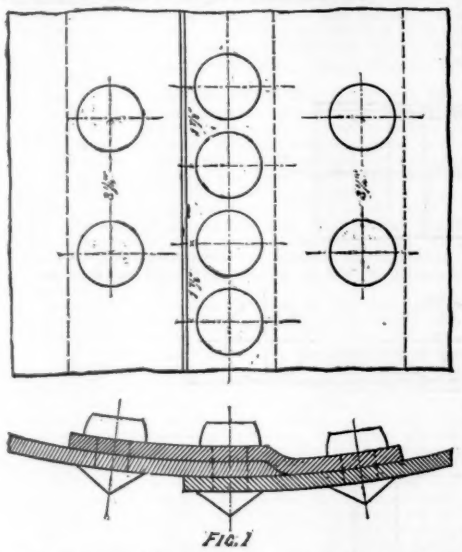


FIG. 1

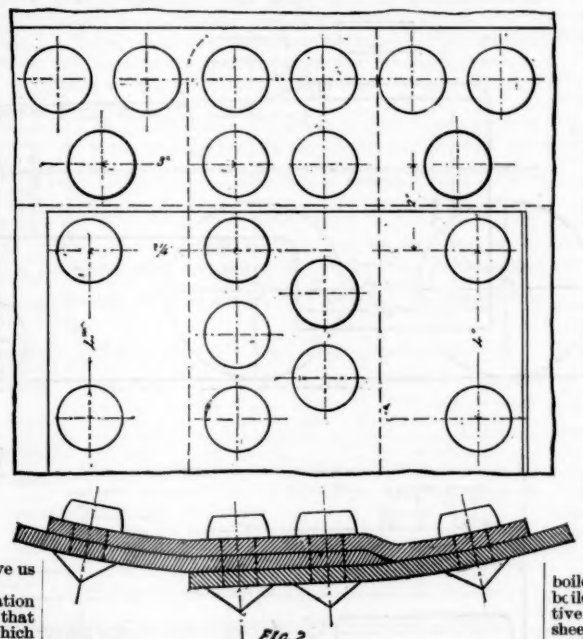


FIG. 2.

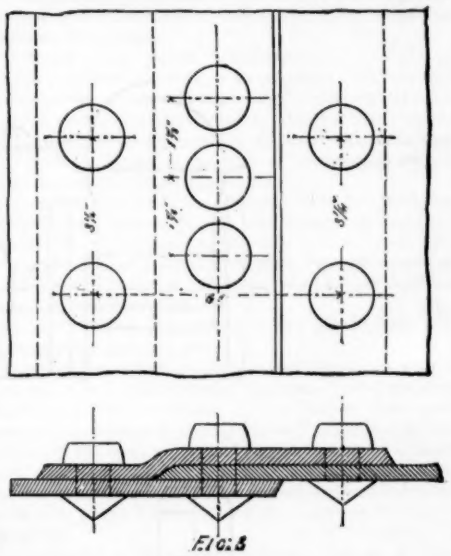


FIG. 3

on the various points under consideration, that would give us some valuable data from which to compile a report.

The circular was sent to all the members of the Association and to a number of other persons, yet we have to report that we received but twelve replies to our circular, four of which were from members of your committee. From the limited information furnished us, it cannot be expected that we will be able to present a report containing much information that is new or conclusive.

From the experience of your committee during the past two years, we conclude that some other plan should be

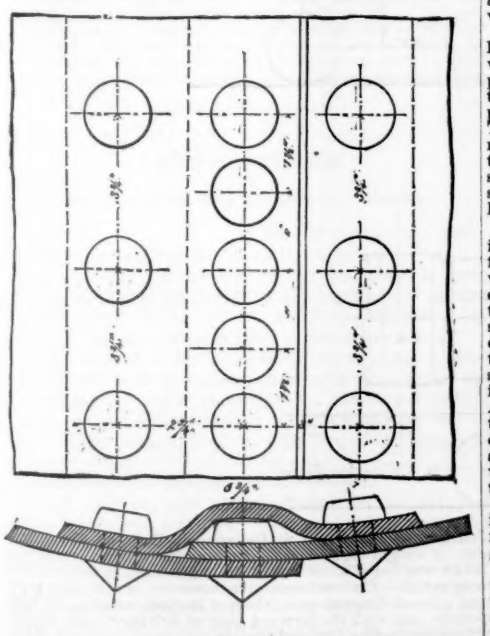


FIG. 4.

adopted in procuring data than that of endeavoring to obtain it in the form of answers to circulars. Out of a membership of over two hundred we received replies last year from but seventeen, and this year from twelve.

The number of locomotives in use on the twelve roads reporting this year is 1,391; of this number 1,298 are coal-burners, burning bituminous or semi-bituminous coals, except 162 on the Central Railroad of New Jersey.

In answer to the question, "Which have you found to be the best material for the shell of the boiler, iron or steel?" the preference is very decidedly in favor of steel. From the replies to this question last year, and the more decided expressions given in favor of steel this year, and from our own observation, we find that steel is rapidly taking the place of iron for the shell of the boiler. Those who have used it longest and most extensively are the most decided in their preference for steel. No objections have been made by any one reporting to your committee against its use in taking the place of iron.

In regard to the best thickness of metal for the sheets of a boiler from 48 to 52 in. in diameter, to carry a working pressure of 180 pounds of steam, the opinion was unanimous that in the case of steel $\frac{5}{16}$ in. was sufficient, and the least thickness to be adopted, taking all things into account; and in the case of good iron, $\frac{3}{8}$ to $\frac{7}{16}$ in. was considered to be the best thickness of metal; these conclusions being the result of long and extensive experience on the part of those giving it, they having in view the weight of the boiler as affected by the thickness of its sheets, the cost of carrying unnecessary weight, etc., and the results of various tests that have been made from time to time of different thicknesses of plates in boilers of a given diameter.

To the question, "To what extent does a welt on longitudinal seams add to the strength of the boiler?" but little positive information was elicited. The practice of constructing boilers on that plan has not yet become general.

Mr. Fuller, of the Atlantic & Great Western Railroad, gives it as his opinion, that the plan of welt, as used in the boilers of his construction, represented in Fig. 1, adds about 20 per cent. to the strength over that of the single seam of rivets.

Mr. Sedgley, of the Lake Shore & Michigan Southern Railway, thinks that the plan of welt he uses in the construction of his standard boiler, as represented in Fig. 2, adds about 25 per cent. to the strength of a single riveted seam.

Mr. Johann, of the Wabash Railway, uses a plan of welt in the construction of his standard boilers, represented in Fig. 3, and states that he does not use the welt so much on account of its adding strength to the boiler as to secure a steam-tight joint.

Mr. Peddle, of the Vandalia Line, states that he has made no tests as to the increased strength due to the use of a welt, but considers it a very good plan to increase the strength of a boiler, and presents the plan shown in Fig. 4, as being a very good one.

The weak points in a cylindrical boiler are of course the longitudinal seams, and the boiler is no stronger than its weakest part, no matter how strong it may be at all other points. The metal punched out all along the seam, in making the rivet holes, weakens the sheet to resist tensile strain in proportion to the loss of metal, other things being equal. The plan of seam requiring the least metal punched out, in making the holes for rivets along any one line parallel with the seam, will be the strongest, yet there must be a sufficient sectional area of rivets in the seam to resist the shearing strain, and to hold the plates securely together to prevent leakage.

The form of the seam and welt is a matter also to be taken into account. In the case of a single row of rivets, and a form of seam shown in Fig. 5, a tensile strain on the sheets would cause the part of the sheets forming the seam to change shape, one sheet springing toward *A* and the other toward *B;* but if the form of the seam correspond with that shown in Fig. 6, no such change from tensile strain could occur, both sheets forming a direct line. Any form of seam that changes its position from strain should be avoided, as a spring of the sheets at the edge of the seam is liable to cause injury at such point, and result sooner or later in a crack. A welt, if properly proportioned and shaped, will unquestionably strengthen the boiler at the seam, so that it may be considered to be within 25 per cent. as strong at the seams as in the middle of the sheet, and if strengthened, then it would certainly be economy to use that plan of strengthening the seams in the construction of boilers.

To the question, "Do your boilers deteriorate from the inside in the form of pits, commonly called pitting?" we have received various answers, but no very conclusive reasons are given as to the cause.

Mr. D. L. Weaver, of the Eastern Kentucky Railway, says that their boilers show signs of pitting at places in the bottom of the cylinder part of the boiler, and sides where braces are attached, and that iron is more liable to be affected in that way than steel. He thinks the original cause is defects in the iron.

Mr. Underhill, of the Boston & Albany Railroad, states that their boilers give no trouble from pitting.

Mr. Coolidge, of the Fitchburg Railroad, states that they have no trouble from this source; that their water is comparatively pure.

Mr. Fuller, of the Atlantic & Great Western Railroad, in answer to that question, says: "Yes, our iron boilers have given us a great deal of trouble from pitting, especially in the bottom part and along the seams." "The pits are of various shapes, round, oval and irregular." "I think that there are several reasons for the pitting." "I would say, first, impure water; and second, poor boiler plates, which have more or less dirt rolled into them when made." "When the impure water comes in contact with the poor iron, the pitting begins." "Have had no trouble in this respect with steel boilers, the use of which we began about five years ago."

Mr. Sedgley, of the Lake Shore & Michigan Southern Railway, says, regarding this matter: "Our boilers deteriorate from the inside in the form of pits. I think iron is *more* likely to do so than steel." This pitting usually takes place on the inside of the lower part of the cylinder of the boiler." "The pits vary in diameter from $\frac{1}{4}$ of an inch to several inches, and increase in depth about $\frac{1}{32}$ of an inch per year." "I attribute this pitting to arise from or in consequence of the impurities in the water we use."

Mr. Johann, of the Wabash Railway, states that he has no trouble with pitting in the boilers on that road.

Mr. Peddle, of the Vandalia Line, says that pitting occurs in the boilers on his line "at the bottom of the cylinder part or barrel; it is generally greatest at the centre of the length or near the front tube-sheet." "I cannot give the rate of increase of the depth of the pits per year." "They seem to increase rapidly after the action is once commenced." "I have been of the opinion that this pitting is caused by the corrosive action of sulphuric or other acids contained in the water and that such portions of the iron are attacked as are not protected by the hard skin or scale." "In rolling plates it frequently happens that there are rough places noticeable on the surface, which probably have been produced by scales on the rolls; such places I consider would be liable to this corrosive action, and would become pitted." "However, this is only a hypothesis, and I give it for what it is worth."

It is evident from the replies to this question that the corrosive action called pitting, does not take place in all boilers alike; we find that upon some roads they are entirely free from such action, while on others much trouble and expense result from this cause. If pitting was the result of original defects in the material composing the shell of the boiler, then we would expect its action to be about the same on all boilers, and on all roads alike. It is not likely that the boilers on one road would have a larger proportion of defective sheets than those on another, nor that the defects in sheets would be found always in the bottom of the cylinder part, and usually nearer the forward tube-sheet than the back one. The inference then is, that some cause exists other than defects in the metal of the sheet. Just what the cause is, your committee are not prepared to say, other than that we believe it to be a chemical action. Why it should occur in spots of various sizes and shapes and irregular in depth, and always near the bottom of the cylinder of the

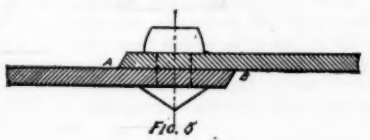


FIG. 5

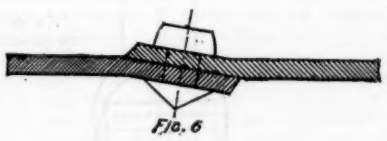


FIG. 6

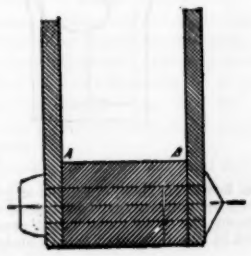


FIG. 7

boiler, usually between the middle of its length and the front tube-sheet, we are unable to explain. It is probable that this part of the boiler, being ordinarily at a lower temperature than other parts above it, and parts nearer the fire-box, and being covered with more or less scale or dirt in connection with the use of water containing ingredients or substances not contained or found in the water used in the boilers on other roads, may be an explanation of the fact that pitting occurs in the boilers in use on some roads, while it does not in the boilers on other roads.

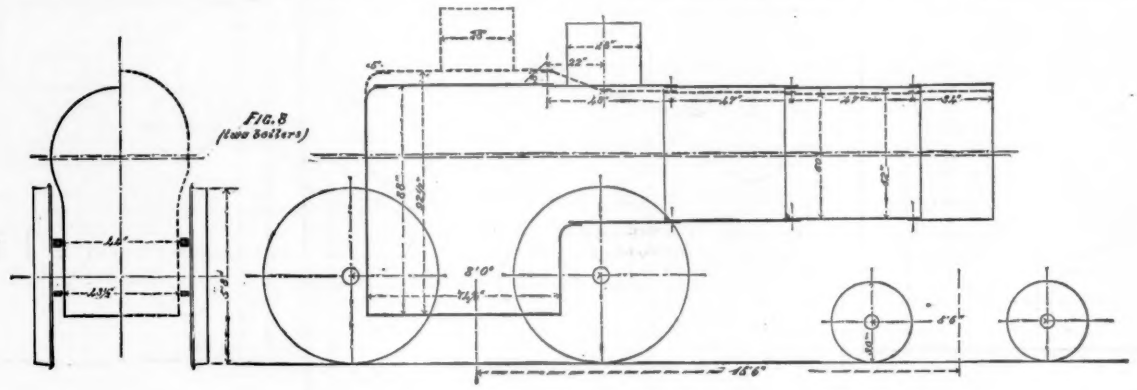
The pitting referred to as occurring on the inside of boilers at points where braces are attached to the outside of the sheets is different from that referred to above, and is evidently the result of both mechanical and chemical causes. The mechanical consists in the strains on the brace springing or bending the sheet opposite the edges of the foot of the brace and thus breaking off the scales from the surface of the sheet, exposing the raw or clean iron to the action of the water. In time another scale is formed over such part, mainly composed of oxide of iron or rust, which in turn is broken off by the springing of the sheet, the process being repeated at intervals more or less frequent, until in time the sheet at such point is materially thinned and weakened by the loss of metal from continued corrosion.

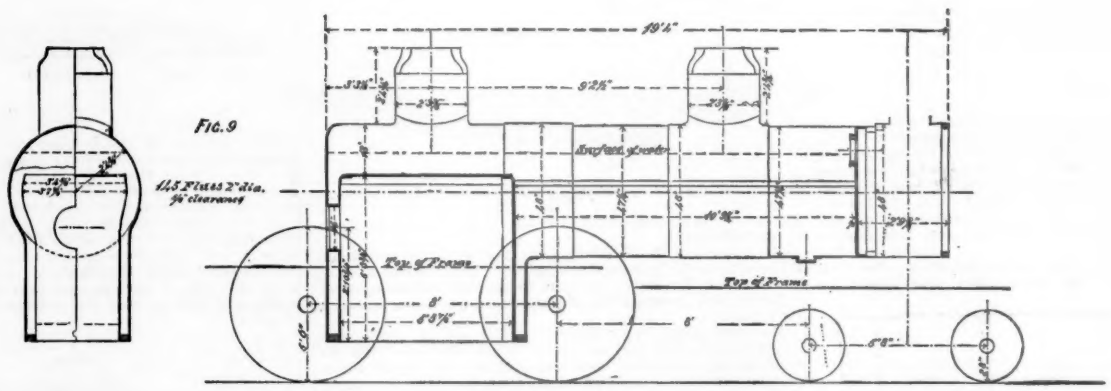
The same is doubtless true in the case of the seams or fur

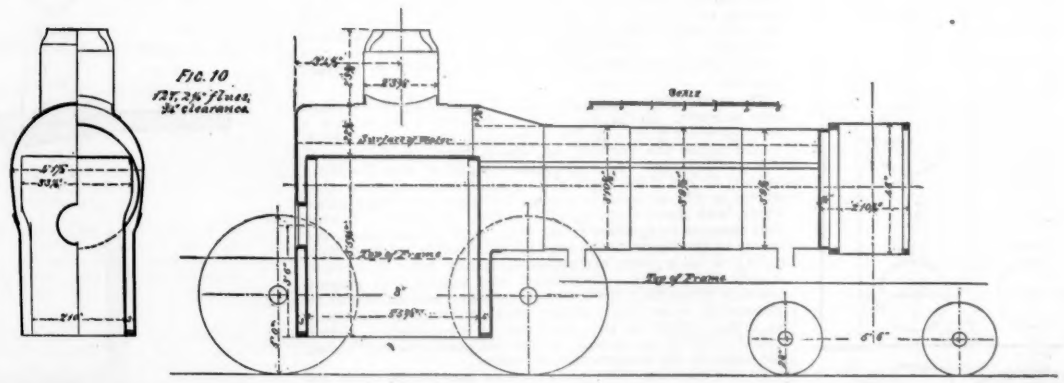
rows sometimes found in the corners or curves of the sheets around the fire-box and in the throat-sheet. The frequent springing of the sheet at those points from the steam pressure or from expansion, producing the same results as in the case of braces, but in much narrower channels resembling grooves or cracks.

The remedy in the cases where the cause is first a mechanical one, is to avoid attaching braces of such form and proportions as to spring the sheet, and to so brace the parts near the corners of the shell about the fire-box and throat and back sheets, that the ordinary working pressure will not cause sufficient spring of the sheet to break the scale at such points.

It is frequently the case that corrosion occurs in the form of channels or grooves, on the water side of both the fire-box sheets and those of the shell of the boiler, immediately along the upper edge of the mud ring. These channels do not ordinarily extend along the edge of the mud ring continuously but in sections, sometimes only two or three inches in length; then for some inches, or for several feet, no corrosion whatever has occurred. In some cases, for instance, in the case of a light mud ring and a wide water space, the cause may be a mechanical one, in breaking the scale from the surface of the metal by springing the sheets at that point. The pressure upon the crown sheet is mainly sustained by the fire-box sheets, and is in the direction of the arrow, Fig. 7. This would tend to spring both sheets at the top of the mud ring, the one toward the mud ring at *A*, and the other from it at







the wagon-top pattern." "Another advantage in favor of the wagon-top boiler is, that more space is given for examination, and for cleaning the crown-sheet and bars of scale, which is very desirable on our line, on account of the character of the water used." "In our form of wagon-top boilers, we widen the fire-box above the top of the driving-wheels, and thus increase the amount of water carried in that part of the boiler." "This, together with the additional weight of the extra metal in the wagon-top and braces, is sufficient to give an additional weight on the drivers equal to about 3 per cent. of the total weight of the engine, as compared with that of a straight boiler of the same diameter and general dimensions."

So far as the form of the boiler is concerned, there can be no question, we think, but that the plain or straight boiler, as it is commonly called, is the strongest and cheapest, and gives least trouble in the matter of repairs; and if of proper proportions, so as to give sufficient steam room, no difference whatever is observed in the dryness of the steam furnished the cylinders—in other words, freedom from priming—between that form and the wagon-top. This is the testimony of all who have replied to the committee's circular, and it accords with our own experience and observation. Mr. Sedgley's views are doubtless correct, that where a proportionally large heating surface is required, the wagon-top boiler is preferable as giving increased steam room.

The wagon-top form, while objectionable in its shape, requiring additional bracing to make it as strong as the plain

Mr. Peddle, of the Vandalia Line, gives an instance of the proportion of the weight of the locomotive carried on the drivers, as effected by the type of the boiler, and says: "The two engines were of the same dimensions of wheels, machinery, etc., and were constructed by the same builder." Engine No. 13 had a plain or straight boiler with two domes, as represented in Fig. 9, while engine No. 36 had the wagon-top boiler, as represented in Fig. 10. The fire-box heating surface in both was the same. No. 13 had 145 2-inch tubes 10 ft. 10 in. long, and No. 36 had 128 2¼-inch tubes 10 ft. 9¼ in. long. Their comparative weights were as follows:

	Weight on trucks.	Weight on drivers.	Total.	Per ct. of total on drivers.
No. 13, boiler empty	23,080 lbs.	37,350 lbs.	60,430 lbs.	61.8
" filled..	25,370 "	41,750 "	67,120 "	62.2
No. 36, boiler empty	23,908 lbs.	37,792 lbs.	61,700 lbs.	61.2
" filled..	25,500 "	42,671 "	68,180 "	62.5

From the above, it will be seen that the difference in weight carried on the drivers was but three-tenths of one per cent. in favor of the wagon-top type of boiler when the boilers were filled with water to two gauges—a difference so small as to be of no practical consequence.

In the case of several different types of locomotives on the Jeffersonville, Madison & Indianapolis Railroad, the difference of weight carried on the drivers due to the form of the boiler was found to be from 1 to 2 per cent. in favor of the wagon-top. On one locomotive, however, of the same type and general dimensions as others of its class, weighing 68,800 pounds, but with the forward pair of driving-wheels placed six inches farther forward than in the others, having a plain or straight boiler, 64.6 per cent. of the weight was carried on the drivers, and those with the wagon-top boiler carried 64.5 per cent. of their total weight on the drivers, or one-tenth of one per cent. less than in the case of the straight boiler.

Distortions of every kind should be avoided in the form of the boiler, whenever it is possible to do so, for the reason that the pressure within tends to change the shape or form at such points, unless strengthened by stays or braces; therefore, the form nearest a plain cylinder will be the strongest and require least bracing, other things being equal. With the use of comparatively pure water, forming no scale of consequence, a dome would, perhaps, be unnecessary where the steam space above the water was sufficient; yet, as an opening of some kind, large enough to permit access to the inside of the boiler is a necessity, such opening, as regards weakening the shell of the boiler at that point is perhaps as objectionable as a dome. If the former can be made so as not to weaken the boiler, there is no reason why the dome cannot be attached in such a way as to be equally strong at that point by flanging the sheet of the shell upward, inside the dome, and the addition of a ring of suitable proportions riveted to the inside of the boiler at the foot or flange of the dome.

B. In most cases, however, these channels or grooves, which are found in spots or sections, are doubtless formed in the same way and from the same causes that produce the irregular pits formed in the bottom of the cylinder part of the boiler.

To the question, "What is the best form of boiler for the ordinary eight-wheel American style of locomotives?" we find that a majority prefer the plain or straight boiler, sometimes called the telescope boiler.

Mr. Coolidge, of the Fitchburg road, says: "I am having all boilers made either on the wagon-top form or with sufficient taper to admit of a fire-box of the same depth as can be had with the ordinary wagon-top form." "This taper form of locomotive boiler I first saw manufactured at the Mason Machine Works, at Taunton, Mass."

Mr. Fuller, of the Atlantic & Great Western Railroad, prefers the wagon-top form of boiler, considering it more economical, all things considered.

Mr. Sedgley, of the Lake Shore & Michigan Southern Railway, who has had a very large experience in the use of different forms of boilers, says that "for boilers with not exceeding 1,000 feet of heating surface, we find the straight boiler preferable; above that, we prefer the wagon- top, on account of increased room for tubes."

Mr. S. J. Hayes, of the Illinois Central Railroad, says on this subject: "We have found that the wagon-top pattern of boilers carries the water better than the straight boilers, and furnishes drier steam, unless the straight boiler is made unusually large in diameter." "I have not noticed any difference between the two styles of boiler in the amount of fuel consumed; if there is any difference, it is in favor of boiler, has its advantages over that form that, in many cases, more than compensate for its defects. It permits a greater proportion of its weight to be carried by the driving-wheels than in the case of a plain boiler, it affords more steam room than the plain boiler, all things being equal; and in cases where water is used containing impurities that form large quantities of scale, it affords room for cleaning the scale and dirt from the crown-sheet—a matter attended with difficulty in the straight boiler.

In the case of two locomotives whose proportions and dimensions were alike in all respects except in the form of the boilers, which, differing in form, yet were the same in capacity, it would doubtless be found that the one having the wagon-top boiler would be the heaviest on the driving wheels. What the difference would be cannot readily be determined, at least not definitely, except in each particular case.

Mr. Johann, of the Wabash Railway, states that there is two per cent. more of the total weight of the locomotive on the drivers in the case of the standard type of locomotive having the wagon-top boiler than in the same with the straight boiler, illustrated in Fig. 8.

In reference to these two standard types of boiler, Mr. Johann says: "As to the difference in the steam area, I increase the diameter of the barrel in the straight boiler, and, while preserving the same stability as in the wagon-top, I obtain a large steam area." "As to the distribution of the weight on the drivers, the wagon-top has the advantage, but I regain the advantage two-fold by increasing the weight of the frames, and by this means securing a much stronger frame."

Your committee have been kindly furnished with a report of a series of tests of the strength of a boiler by Mr. Howard Fry, of the Philadelphia & Erie Railroad. The tests were made at the Altoona shops of the Pennsylvania Railroad, under the directions of Mr. Ely, Superintendent of Motive Power. The boiler tested was made of steel, and one of their "I" engines, consolidation pattern. As drawings of these engines have been widely distributed through the scientific press of this country and abroad, it was not deemed necessary to present a drawing of it with this report.

The report of these tests is as follows:

"TESTS OF A CLASS 'I' LOCOMOTIVE BOILER.

"Before the tests were made the water contained in the boiler was slightly heated, and then measurements were taken at various points of the boiler to ascertain what change of shape would occur when pressure was applied.

"*Test No.* 1, *June* 2, 1877.—Pressure was applied and measurements first at 200 lbs. pressure, when it was found that part of the sheet of the boiler underneath the dome, where a transverse section of it shows an oval shape, had drawn in transversely to the extent of $\frac{3}{32}$ in. at 250 lbs., this decrease of the minor diameter amounted to $\frac{5}{32}$ in. more; at 300 lbs. to another $\frac{1}{32}$ in., or at this last pressure a total of $\frac{9}{32}$ in. Measurements taken on the barrel of the boiler showed a circumferential expansion of about $\frac{1}{32}$ in., which took place between 0 and 200 lbs. pressure, and did not afterward increase in any measureable degree. At reaching 375 lbs. pressure the leakage was so great that it was found impossible to supply the water fast enough to bring the pressure above the figure given. The leakage occurred mainly through seam at base of dome, through the seams at ends of neck sheet and through horizontal seams of waist sheet. The fire-box, fire-box shell, barrel, and tube sheets were very tight.

Test No. 2, *June* 13, 1877.—The boiler had not been caulked in any of the places where it leaked badly in the previous test; the pressure was quickly run up to 300 pounds and then to 420 pounds, when the cast-iron dome ring broke in three pieces, and was projected upward for a distance of about 10 feet, leaving the lower part remaining on the boiler. The boiler leaked badly on the waist course, especially the two horizontal seams and at the base of the dome. Neck sheet also leaked badly at the ends and around the bridge pipe. This latter sheet became distorted under the great pressure, and subsequent examination showed that front sheet also had bulged out slightly on the unsupported space above the bar.

The rivets in the feet of stays to the front tube-sheet leaked considerably, fire-box, fire-box shell and barrel of boiler scarcely leaked at all.

"*Test No.* 3, *June* 16, 1877.—A new dome ring of stronger dimensions had been put in and the boiler caulked. Pressure soon reached 425 lbs., when the rivets in feet of stays to front tube-sheet broke, and that portion of the tube-sheet supported by them bulged out, bending the bar and tearing loose from the upper row of tubes. The boiler did not leak very much, except around bridge pipe, and this was owing to the distortion of the neck sheet.

"*Test No.* 4, *June* 27, 1877.—Front tube-sheet had been strengthened by turning the feet of the old stays aside, riveting them to the sheet, and putting in a second set of stays made of 1¼ in. round iron, passing through tube-sheet, with nuts on outside and having the other end riveted to the third course of the barrel. The bridge pipe was taken out, and a large brass plug screwed into the neck sheet, and the pipe for pressure gauge fitted to this.

"Pressure soon reached 420 lbs., and at this point the neck-sheet bulged out very much, destroying the threads on the plug and tilting out the water to such an extent that further pumping had to be discontinued. The bulging of the neck-sheet also bent the roof-sheet and dome base-sheet considerably. Bottom rivets in front tube-sheet stays leaked badly. Fire-box and fire-box shell showed no leaks, nor did any of the stay-bolts.

"*Test No.* 5, *June* 30, 1877.—A patch had been put over the hole in neck-sheet and the boiler caulked up.

"Pressure soon reached 445 lbs. without any accident to the boiler. This pressure was within 5 lbs. of the load of the accumulator, and after keeping the pressure on for a short time the test was discontinued. The boiler leaked somewhat, but not badly."

[TO BE CONTINUED.]

Contributions.

Imperceptible Slip of Driving Wheels.

ST. LOUIS, June 10, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following contribution to the discussion in your columns of "Imperceptible Slip of Driving Wheels" (see Dec 14, 1877, and March 15, 1878, by Mr. Krajewski and "A. M. W.") is not likely to require much explanation.

By the kindness of Mr. J. Johann, Master Mecha Western Division Wabash Railway, a counter belonging the undersigned was fitted on engine No. 166 to the driving wheels, and on Saturday, Jane 8, 1878, took train No. 44 from East St. Louis to Decatur, a distance of 110 miles, and returned with train No. 45 the same day.

Both trains were passenger accommodation.

It had rained the night before and the track was wet; part of the run through a fog, part in the rain, and only 30 miles in clear weather, at the end of the second run. On the first trip the counter was read at every mile-post and at every even minute, and at the end of the run the readings differenced and carefully inspected. On the second trip the counter was read only at the tenth mile-posts. The Wabash passenger time is well known to be "fast," and the exact counter reading sometimes a matter of difficulty; but the 100 mile readings were good ones.

On the first trip the failure of a brake on a car caused the engine to run by a water tank, and there were four turns made backward; as the engine went twice over this ground, eight revolutions are deducted on this trip. The counter was read by the undersigned, except for the last 30 miles of the second trip, when it was taken by Mr. G. D. Brooke.

The following is a summary of the "log:"

No. of mile-posts from Toledo.	No. on the counter.	Difference.	No. of turns in 100 miles.	No. of turns per mile.
424	3,004	....	....	....
324	33,707	30,703	30,695	306.95
324	34,884	....	....	....
424	65,579	30,695	30,695	306.95

The diameter of the driving-wheel, measured roughly, was 65¼ in., which gives 306.74 turns per mile; and as the tread was coned and worn hollow, an error of $\frac{1}{32}$ in. would account for the difference (0.25 turn per mile), which may, therefore, be truly called "*imperceptible slip.*" If Mr. Krajewski, or "A. M. W.," can give a log with a long run, taken with a counter, showing a really definite value, they will greatly oblige by giving particulars. CHAS. A. SMITH.

The Problem of the Trains.

COVINGTON, Va., June 10, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I accept the criticism of Mr. Markham in reference to my solution of the "Problem of the Trains" which appeared in your number of May 31. I made the solution hurriedly. Mr. Markham's formula is applicable only to one particular case—that in which the distance from the point of collision to the terminus is one mile. In this case, the length of the railroad is always less than six miles, whatever may be the relative speed of the trains. If the difference in speed is small, the length will exceed three miles but little.

The solution of "L. P. T." is correct and simple; so is Mr. Markham's for one particular case, as stated above. The problem is, however, capable of a still simpler solution. If you deem it worth publishing, I give below a solution which I think is simpler than either, and can be comprehended readily by one familiar with mental arithmetic.

Let m, n and a represent, as in the former article, the relative speed of the trains per hour and the distance from the point of collision to the terminus. Put d for the length of the road.

If the freight train had retained its speed its distance from the terminus at the time the mail reached the point of collision would be $\frac{m}{n}a$. The mail is distant a miles. Hence the difference of both apart would be $a - \frac{m}{n}a$, provided the speed remained constant; but as the speed of the freight, after two-thirds of the journey, is diminished one-half, we shall have $\frac{1}{6}d - a = a - \frac{m}{n}a$. Transposing, etc.,

$$d = 6a - 3\frac{m}{n}a = \frac{3a(2n-m)}{n} = \text{the length of the road.}$$

Dividing this equation by m and n, the relative speeds, and taking one from the other, we have the difference in time—

$$\frac{3a(2n-m)}{nm} - \frac{3a(2n-m)}{n^2} = \frac{3a(2n-m)(n-m)}{mn^2}.$$

These formulæ are a little different in form from the former, but are equivalent. I think these are perhaps in a simpler shape for calculation.

The length is $d = \frac{3a(2n-m)}{n}$

The time, $t = \frac{3a(2n-m)(n-m)}{mn^2}$

D. SHANAHAN.

Publication of Engineering Statistics.

CLEVELAND, O., June 4, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE: .

Might I suggest to the gentlemen holding the Civil Engineers' convention at Boston the propriety of taking some steps toward collecting and publishing, from time to time, such statistical information as can readily be obtained with but little expense by voluntary contributions from its members, such as carefully prepared statistics on the wear of rails or on the wear of car wheels, or on the work performed by pumping engines, or on the numerous questions that will suggest themselves to any one?

I had occasion some time ago to look up some information upon a point of great interest to the profession, and was surprised to find, first, how little was recorded, and secondly, what a small percentage of that little was carefully and systematically presented.

If it is considered that the publication of such information, however valuable it might be, would not be suited to the pages of the proceedings of the society, perhaps a semi-official publication in your valuable paper would answer the purpose, as I do not doubt you would be perfectly willing to give the necessary space every month, or every quarter, or every half-year, as may be thought best.

The object to be attained is simply some publication for future reference, of concise and well-arranged statistics, such as many engineers now have in their offices, and such as many more should have and can have with but trifling expense. CHARLES LAMB.

[Mr. Lamb is evidently not intimately acquainted with the Society of Civil Engineers and its wonderful capacity for *not* doing things, or he would not entertain any such expectations as he has expressed above. —EDITOR RAILROAD GAZETTE.]

The Running Gear of Cars.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It would seem that the ability to correctly appreciate the force of an example must be one of the rarest of human qualities. Your correspondent "C," in your current issue asserts that "if a horse travels in a circle upon ice drawing after him a wagon, there is no 'reaction of the rail upon the flange' *nor anything corresponding to it.*" From this he proceeds to draw certain conclusions.

If "C" will "pause to reflect" for a moment, he will perceive, *first*, that his wagon wheel-base is not rigid, so that his example has no pertinence, and *secondly*, that the reaction of the horse's hoofs against the ice and of the horse's body against the shafts supplies a force precisely corresponding to the reaction of the rail against the flange. This point being settled, it is hoped that "C" will see reason to revise some of his other arguments and conclusions. A. M. W.

Locomotive Performance on the Missouri, Kansas & Texas Railway.

SEDALIA, Mo., June 4, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the *Gazette* of May 24 [page 255] appeared an article headed "Performance of American Locomotives," in which the published report of average mileage of revenue engines on this road for the year 1876 is discredited.

It may be useless to reiterate the statement with any hope of convincing your correspondent of its truth, nor is this desired; but the readers of the *Gazette*, and especially those of them who feel an interest in Western roads, may be assured of its entire correctness.

The actual train miles average for the year 1876 on the Missouri, Kansas & Texas was correctly stated, viz., 37,811 per engine, and in this is included nothing for "shunting" or for engine waiting orders under steam;" nothing in fact but the schedule miles of trains.

In this average there are instances of greater and of less miles than the average, as a matter of course.

Engines are run *every day in the year* over divisions or runs, as follows: One of 142 miles, and others of 159 miles; 117 miles, 158 miles and 157 miles, respectively; and there is no trouble in duplicating the average of 1876, except want of business for engines.

No attempt in the way of "continuous runs" is made, except the long divisions may be so regarded. We look upon engines as *tools provided to work with as required;* and men enough are employed to work them. This practice is general with our neighbors, and doubtless they may be able to show equal or better figures, if the fear of your correspondent's doubts do not prevent them doing so.

The engines used are of the following builders: McQueen, Grant, Baldwin, Mason, Rogers and Pittsburgh, and range from 16 to 17 in. cylinders in freight service, and from 14 to 16 in. cylinders in passenger service. General repairs are required in an average of 2¼ years, the running repairs of course being kept well in hand.

For 1877 the average per engine was 36,908 miles, a decrease from the previous year.

Singularly enough, appended to the article referred to above was a foot-note—editorial doubtless—giving the statement of Mr. Wm. Buchanan of the Hudson River road, whose engines appear to average for 1877 much greater than ours, or 38,422 miles per engine. Doubtless this will not be passed over with "*I do not believe it;*" but may be accorded that courtesy shown in the case of Superintendent Ely, whose figures were larger than the ideas and experience of your correspondent. G. W. CUSHING,

Superintendent of Machinery, Missouri, Kansas & Texas Railway.

Effect of Cylinder Condensation on Consumption of Steam.

ST. LOUIS, June 10, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reading the valuable report of tests of locomotives by Mr. John E. Martin, published in the *Gazette* of May 31, I noticed one thing which it is well to call attention to. Mr. Martin draws his inferences as to the economy of his various valve arrangements by the consumption of water per indicated horse-power per hour from the computation of the quantity of water used shown as steam in the indicator cards. Such a computation and comparison is very liable to mislead, as it does not take account of the "cylinder condensation" so well known to those who have ever made careful experiments.

To illustrate the magnitude of this cylinder condensation, I will give the results of computation of consumption of water during a part of test of Wabash Engine No. 180, published in *Gazette* of May 24. During trip "A" from a run of 70 minutes with lever in notch 1 the amount of water used, as computed by Mr. Martin, was 92 lbs. per minute, while the actual water used from the tank was 132 lbs. per minute, the difference, 40 lbs. per minute, being condensed in the cylinders. The actual consumption of water was 27 lbs. per indicated horse-power per hour, while the consumption from the indicator diagrams was only 18.9 lbs. That this is by no means an isolated case may be found by referring to Clark's "Railway Machinery" or to Bauschinger's "Experiments," see *Engineering*, Oct. 20, 1871, where the initial condensation varies from 20 to 70 per cent. in locomotive cylinders.

Mr. Martin makes the statement that the loss is about 10 per cent., but it is always greater with the higher expansions than with the lower, and though not affecting in any great degree the conclusions drawn by him, still it is to be wished that the actual use of water had been given by him in each case. CHAS. A. SMITH.

A Dry Goods Palace Car.

A correspondent of the *American Manufacturer* says: "The United States Rolling Stock Company, at their shops in Chicago, are getting up what may be called a new departure. This is a palace dry goods car, to be used on railroads by dealers in dry goods, carrying samples along as well as stock to be delivered when sold. This car is 60 feet long, not including platforms at each end, or 66 feet long over all. Is built as light as possible and yet is strong. The construction of the body is very simple having only two large windows on each side for lighting purposes, but at each end there is to be a stateroom for the traveling merchants to occupy nights or days, while on the roads. These staterooms are lighted by three small windows each. The inside of the car was not finished for use, so we cannot tell just how it is to be arranged, but no doubt convenient for the purpose. This car has a sub-cellar, as they call it, between the fore and aft trucks, where may be stored large quantities of domestic goods while in transit, and it has what may be called a mansard roof, or double deck, for light and ventilation, giving it the appearance of a sleeping car—except the finish. This is a new enterprise, and it remains to be seen upon trial, if it shall prove a successful one."

RAILROAD GAZETTE

Published Every Friday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

THE LEGAL SANCTION OF COMBINATIONS.

All the combinations and agreements concerning the maintenance of rates, the division of traffic, etc., that have been made heretofore by American railroads have been contracts which could not be enforced by law, or at any rate have been such as none of the parties to them would attempt to enforce by legal process. There seems to have been a very general misapprehension in the public mind with regard to this. People have seen agreement after agreement made, and pretty much all that they have heard of them afterward was complaints that they were violated. It is true that they would not be likely to hear much of them if they were strictly kept. The machinery is of the kind which makes no noise unless it breaks or gets out of order. But it is doubtless true that the violations of railroad agreements are so frequent that it would be hard to find a parallel for them in other branches of business. This astonishes business men, who cannot understand why it is that railroad contracts are not kept like other contracts, and are naturally led to look upon railroad managers as a class who are especially deceitful and untrustworthy in their dealings with each other; who promise and do not perform, and are accustomed to promise when they do not intend to perform.

We shall not now deny that the conduct of railroad managers in their dealings with each other sometimes seems to afford strong confirmation of the doctrine of total depravity. Some very bad things have happened, and they have happened so frequently that it has become evident that, to say the least, it will not do always to trust to the honor of the railroad representatives to keep their word. This is bad enough; but after all, is it wholly exceptional? If there is more complaint of broken agreements in railroad business than in most other affairs, it must be remembered that in railroad business the agreements which are broken are mainly those which the law does not compel the companies to keep. We do not find that railroad corporations are less strict than others, companies, firms or individuals, in keeping ordinary contracts. They pay their debts, when they have money, and fulfill generally their legal obligations. They have the fear of the constable before their eyes, or, like the rest of us, have been so disciplined by the existence and reasonably certain execution of the law as to act unconsciously as if they had the fear of the constable before their eyes.

And the sanction of the law goes further in ordinary business than usually appears. Doubtless there are numberless transactions between individuals which are strictly kept, although they are so made that they could not be enforced by law. But in these cases it is known that if the parties do not keep their informal contracts they will thereafter be required to make formal ones. This ever present consciousness affects the conduct of the whole community. Usually those who promise can be made to perform.

But this is not the case with the agreements of railroad companies concerning the maintenance of rates and the division of traffic. If all the parties to such an agreement keep it strictly, well and good; but if not, if one or more violate their agreement, why, that is the end of it. The other members may perhaps be able to make it uncomfortable for the delinquents, but they cannot compel them to keep their contract. For that, unanimity is required. When the number of parties to such an agreement is large, the danger of course increases, and as the strength of a chain is only equal to that of its weakest link, so the strength of the combination is determined by its least scrupulous members. They all know beforehand that their agreement cannot be enforced, and this knowledge has an effect, chiefly, probably, in making them distrustful of combinations, and therefore disinclined to enter into them; but also, to some extent, it is to be presumed, in causing the dissatisfied and unscrupulous to agree to terms which they do not expect to be permanently satisfied with, because they know they will not be legally bound by them, and do not mean to be actually bound by them if they do not turn out favorably.

Now it is perhaps as well that in the first stages of the development of combinations they should have no other sanction than the good faith of the parties to them, weak as that may seem to be when the contracting parties are numerous. The problem is not one to be solved off-hand and forever. It might be a misfortune if the companies could overcome the trouble, as it affects them, too easily. Time and experience are needed, though of course both may be sacrificed, and apparently often are sacrificed, resulting in no progress. But in the long run we shall certainly learn; and what it is that requires to be done, and practical methods of doing it, will probably be developed faster by the free action of the companies, unsupported by legal sanction.

But at present there seems likely to be such discouragement, by reason of the ill success of the Western combination, that the probability of future experiments is lessened, or rather the time for another experiment is rendered more remote. And certainly there is little encouragement to spend time and thought in arranging a plan of combination if the conviction prevails that the parties to it will not keep good faith, and that the agreement is likely to be broken as soon as some one becomes dissatisfied with its working. The feeling is very common now that the one thing needful is power to enforce an agreement. A little while ago the difficulty was to get people to agree. That difficulty seems to have been got over with wonderfully well in many cases recently, though it spoiled a promising plan last Wednesday, and the conviction has become quite common that the old method of agreements as to the rates on freight from competitive points must be supplemented and fortified by agreements as to the shares of such freight to be carried by the different routes competing for it. The settlement of the shares, of course, is always a delicate matter, but it has in most cases been effected when an honest effort was made. At least, the difficulty of determining the divisions no longer seems to be considered a formidable obstacle to the making of a combination.

Now people are troubled to know how they shall enforce their agreement after they have made it, and naturally this brings to their minds the law, the ordinary instrument for enforcing the obligation of contracts. In various quarters the wish is expressed that contracts may be so made between the companies, and such legislation be obtained that a combination of companies to maintain rates and divide traffic may be enforced in the courts, like a contract for the lease of a road, or one for the purchase of materials.

Something of the kind has occurred in Great Britain. Their "joint purse" agreements (which are usually between two and not among several companies, however,) frequently have the special sanction of an act of Parliament, though we believe that there, without some special authority by Parliament, such an agreement cannot be enforced, though they are, or were, sometimes made and carried out. Parliament had to be convinced that the agreement would be of advantage to the contracting companies and at least without detriment to the public.

In this country there is much more jealousy of the railroad companies, and there is especially a feeling (which was once common enough in England also) that a combination of railroads is a conspiracy against the public. Now, so long as this feeling prevails there is little prospect that the legislation needed to give the courts cognizance of these contracts can be had, unless something is offered in return—unless the railroads accept with the legislation which may enable them to make their through traffic profitable some restrictions in the exercise of that or some other powers which may prevent abuses or what may to the public seem to be abuses. In this way, possibly, two ends may be served—a way found to secure reasonable rates, and a guarantee given which may placate the public. For the latter are or may be interested in the maintenance of remunerative rates on through traffic. The enormous differences between through and local rates, which are the inevitable consequence of the present method of doing things, are the occasion of most of the dissatisfaction with railroads in the West (where, however, the people profit most by this policy), and they are doubtless the cause of much actual injury to a great many persons. Some assurance that these differences would be lessened—that where a reasonable profit was secured on through freight there should not be an unreasonable profit on local freight—would be likely to make many favor the requisite legislation.

But probably it is too early to expect anything of this kind yet for a while. The railroads must first satisfy themselves thoroughly as to what they need. When they are fully convinced as to the policy which it will be wise to adopt, then they may ask for help to enable them to adopt it, if they cannot without help. It is not wise to look to legislation for help out of every difficulty, and it will be altogether vain to expect that legislation in this matter will be able to do anything more than to enable the companies to help themselves. They must not ask the legislative power to manage their business for them; it would make fearful work of it: nor need they ask for any exceptional powers. It is the present limitation of their power to make contracts which are binding before the law that is exceptional. This exceptional disability may be justifiable under the actual state of the powers of the railroad companies; but some limitation in those powers may warrant the removal of the disability.

The Union and Kansas Pacific.

The newspapers have doubtless made rather too much of the combination of the Union and Kansas Pacific. At first they had half-a-dozen railroads in the arrangement, and not combined, but consolidated, bringing virtually the eastern terminus of the route to the Pacific to St. Louis, through which now scarcely any of the freight passes which is shipped through between the Eastern States and the Pacific coast. The actual conbination is a natural and a sensible one, including the Kansas Pacific from Kansas City west to Denver, the parallel Union Pacific, from Omaha to Ogden, and the two north and south roads which unite the two between Cheyenne and Denver—the Denver Pacific and the Colorado Central. Really, however, the parties to the combination are but two, the Union Pacific and the Kansas Pacific, for the latter controls and works the Denver Pacific, and the former controls the Colorado Central. At the last election it was reported that a large interest in Kansas Pacific stock was acquired by the Union Pacific managers, some of whom were chosen directors of the Kansas Pacific, and it was to be expected that the two companies, which have had two distinct and important subjects of dispute, should prepare to work in harmony. One of these subjects, which has come prominently to light during the present session of Congress, is the pro-rating of through business; the other is the command of the Colorado traffic. By its control of the Denver Pacific the Kansas Pacific was, until recently, master of the situation with regard to the latter, as against the Union Pacific, which could only reach Denver and Colorado through this same Denver Pacific. But the completion of the Colorado Central's line to the Union Pacific near the close of last year gave the latter a line of its own through to Denver, and enabled it to bid for all the Kansas Pacific's Colorado traffic. For some time this spring, in conse-

quence, there was a lively competition for this traffic, and rates were reduced to a fraction of what they had been. Now the Denver Pacific, the new line of the Colorado Central, and the western 200 miles or so of the Kansas Pacific, receive almost their sole support from this through Colorado traffic, the local traffic being almost nothing. There was thus special reason why the contest should come to an early end.

The arrangement reported is purely a "joint-purse" agreement, such as is very common in England. The gross earnings are pooled, and 71 per cent. of the aggregate turned over to the Union Pacific, 19 per cent. to the Kansas Pacific (which works the Denver Pacific), 6 per cent. to the Colorado Central and 4 per cent. to the Omaha Bridge Company, which is virtually a part of the Union Pacific. This is not a consolidation nor a lease, but simply a contract by which the three companies are made to have common interests. The officers of the Union Pacific, however, will direct the management of all three roads, it is reported.

The mileage of these roads is as follows:

Union Pacific	1,035¼ miles.
Kansas Pacific (including Denver Pacific)	914¼ "
Colorado Central	175 "
Omaha Bridge	3 "
Total	2,128 miles.

Included in the Kansas Pacific's mileage are, besides the Denver Pacific, three branch roads with 136 miles of road which it leases, and do not form a necessary part of the road and may not be included in the agreement.

It will be seen that the Union Pacific, with the Omaha bridge, which has a little less than half of the mileage (48¾ per cent.), receives 75 per cent. of the earnings; while the Kansas Pacific with (presumably) 43 per cent. of the mileage, is to have but 19 per cent. of the earnings. This, however, is in accordance with the earning capacity of the roads; indeed, the Kansas Pacific seems rather to be favored by it than otherwise. The earnings of the two roads for 1876 were:

Union Pacific	$12,886,859
Kansas Pacific	3,000,801

The arrangement, as reported, takes no account of expenses or traffic, but simply divides the gross earnings, which makes it for the advantage of each road to do as little of the competitive business as possible, and turn it all upon the others, its gross earnings being unaffected by such diversion and its expenses being reduced thereby; but it is not probable that all the provisions of the contract have been made public.

Accident Insurance for Railroad Men.

One of the great Austrian railroad companies, the Southern Railroad, has for several years had an institution for insuring its employés, the results of which have recently been analyzed by Dr. Rachel, an expert in such matters. There are two groups of insured employés, forming virtually two insurance societies. One of these includes the men employed in station service, maintenance of road, engine-house service, and the care of the stores (men working in shops not included). The other includes generally the train-men, conductors (of which there are two classes, called "chief" conductors and conductors), enginemen and firemen. The insurance provided is not generally against death or injury, but against these when they occur in exercise of the company's employment, or in connection with the operation of the road. The members pay fixed premiums, which are not a certain percentage of each member's pay, but vary according to the class of employment; all the members of the same class pay the same amount. And the amount of insurance varies in the same way. One sum is paid for death, another for injury which wholly disables the injured, and a third for cases of partial disability.

The members of the first class—that is, those who are not train-men, pay a sum of about 9 cents monthly; those of the second class are divided into two categories: enginemen and chief conductors pay 15 cents a month; firemen, conductors and brakemen, 10 cents. The payments are taken from the wages of the members. Membership in the first class is compulsory for a considerable number of the men, and permissible to all. The railroad company has agreed to make yearly contributions to the insurance fund, but it has changed the amount of its contribution several times. Membership in the second class is obligatory for the train-men named, even if they are but temporarily in the company's service.

Members of the first class in case of death or total disability are entitled to a sum of about $360; and in case of an injury which incapacitates them for the company's service, but does not prevent their pursuing some other gainful occupation, are entitled to $240. In the class of train-men, engineers and chief conductors receive $540 and $360 in these two cases, respectively; firemen, conductors and brakemen, $360 and $240. Moreover, members of the first class receive 12 cents a day and those of the second class 22 cents a day during the time when receiving treatment from a physician in cases of temporary disability, but not for more than six months, without special permission, and then the payments are subtracted from the amount of insurance that may afterward become due.

Members are not allowed to dispose of their insurance by will. If the deceased leaves a widow but no children, she receives the whole; if children but no widow, the children receive the whole in equal portions; if there is a widow *and* children, the widow receives half if there are not more than two children, and a third if there are three children or more, the children sharing their portion alike.

Members are excluded from the benefit of insurance whose injury is intentional, the result of their own drunkenness, or quarreling, or if they refuse the care of a physician.

Further, a member forfeits his insurance when, if a voluntary member, he withdraws from the insurance society; when he abandons the service of the company or is dismissed from it; and when he is pensioned (from another and distinct fund).

The result of this arrangement has been financially satisfactory.

The first group (employés not train-men) began in 1870 by paying 15 cents a month, and the company contributed 3 cents monthly for each member. Now the member's payment is reduced to 9 cents, and the company's to 0.9 cent. At the same time, the amount of insurance for total disability has been increased from $150 to $360 and for partial disability from $100 to $240. However, because of certain abuses, the payment in case of sickness has been reduced from 21 to 12 cents per day.

In the class of train-men, no change has been made in the amount of the members' contributions, but the amount paid as insurance has been increased from $400 and $250 for total disability to $540 and $360, and from $300 and $150 for partial disability to $360 and $240.

The total number of members of Group A (not train-men) from Jan. 1, 1870, to Dec. 31, 1876, seven years, was 29,104, nearly two-thirds of whom were voluntary members. The total number of injured in that time was 2,530, or 8.7 per cent. of the whole number. Of those engaged in the traffic service (freight and passenger offices, etc.) 8.81 per cent. were injured; of those connected with the trains (but not train-men) 12.02 per cent.; of the road men, 7.41 per cent. Out of the 2,530 injured only 63, or 2.49 per cent., died; 12, or 0.47 per cent., suffered partial disability, and had to leave the service of the road; and only 5, or 0.19 per cent. of the whole, were totally disabled. Of the whole 2,530, 2,450, or nearly 97 per cent. of the whole, were able to resume their employments.

The finances of this group have been extremely favorable. In the seven years the receipts amounted to about $42,385, three-fourths coming from the members and one-fourth from the company. Meanwhile the expenditures were only $24,505, as follows:

Insurance paid to heirs of deceased members (An average of $1,978 per year.)	$13,850
Daily payments to the sick (An average of $1,067 per year.)	7,470
Insurance to the partially disabled	1,625
Insurance to the totally disabled	1,000

At the end of 1876 the assets of the insurance association amounted to $3.11 per member; at the end of 1872 they were but 63 cents.

Group B, including the train-men, is divided, as has been mentioned, into two classes, the first composed of chief conductors and enginemen; the second of conductors and firemen. In the eight years from Jan. 1, 1869, to Dec. 31, 1876, this group has had 16,032 members, 1,414 of whom were chief conductors, 2,395 enginemen, 8,583 conductors (there is more than one on a train) and 3,640 brakemen. The injuries to these in the eight years were:

Number.	Chief conductors.	Engine-men.	Conductors.	Firemen.	Total.
Injured	84	256	759	661	1,760
Died	4	5	40	4	53
Total disability		2	2	2	6
Partial disability	1		10	2	13
Per cent. of total.					
Injured (of members)	5.94	10.74	8.85	18.16	11.00
Died (from injuries)	4.76	1.95	5.27	0.60	3.00
Total disability "		0.77	0.26	0.30	0.34
Partial disability "	1.20		1.32	0.30	0.74

What is particularly notable about this is, in the first place, the large proportion of members injured (in the case of firemen between a fifth and a sixth of the whole number); and, in the second place, the very few cases of serious injury. Thus of the firemen, while 18 out of every hundred suffered some injury, of the whole number of 3,640 only eight were compelled by their injuries to leave the service of the company, four of whom were killed.

The funds of this group have not accumulated like those of Group A, that is, the insurance premiums have been more nearly in proportion to the actual cost of the insurance. The total receipts of the eight years were $43,684 (an average of $5,460 per year), and the expenditures have been $33,616 ($4,202 per year). These expenditures were as follows:

Insurance to heirs of deceased members	$18,120
Daily payments to the temporarily disabled	10,678
Insurance to the partly disabled	2,570
Insurance to the totally disabled	2,248

The payments on account of temporary disability indicate for 62,248 days of such disability in the case of Group A, which is about 26½ days for each person injured, and 2.14 days for each member. The number of days we are not able to ascertain for Group B (train-men), as the first class receives 67 kreutzers (half as many cents) and the second 45 per day. But if *all* were of the lower class, the payments for the eight days would cover a total of 47,460 days of disability, which is an average of 27 days for each person injured and of a little less than 13 days for each member of the group, which would represent the average yearly loss of train-men on that road from injuries received in the service, if both classes received the same. As it is, it must be something less than that, but probably not a great deal less, as the number of members in the first class is not one-fourth of the whole.

This, it will be observed, is purely a provision for accident insurance, and may (and probably does) exist alongside of other insurance and pension funds established in connection with the company. The payments seem in this country very small, but the working of the institution is perfectly illustrated, and a change in the amount of monthly premiums would provide a proportional change in the insurance payments. Aside, however, from any value that it may have as an example of an insurance society, it illustrates well by long experience the actual risks of different classes of railroad employés, and deserves attention on that account.

Some Statistics of East-Bound Freight.

The reports of Mr. Guilford, the Western Commissioner, of the number of tons of through freight shipped eastward from Detroit and Peoria by each road for the first month of the apportionment, March 11 to April 11, have found their way into the Chicago *Times*, as follows:

DETROIT SHIPMENTS.

	Class. 1.	2.	3.	4.	Special.	Total.
Canada Southern	33	40	36	22,398	594	23,001
Lake Shore & Michigan Southern	55	16	24	816	496	1,407
Great Western	858	421	1,560	100,072	2,055	104,966
Grand Trunk	43	49	87	34,725	10,092	44,996
Total	989	526	1,707	157,911	13,237	174,370

Of the total amount of freight, which was sufficient to afford 670 car-loads every week day, 98.15 per cent. was fourth-class and special, carried at the lowest rates, and only 1.85 per cent. of the three higher classes—0.57 per cent. first-class, 0.30 per cent. second-class, and 0.98 third-class. Of the low-priced freights, 90.56 per cent. was fourth-class, and 7.59 per cent. special. The actual distribution by the different routes was:

Great Western	60.2 per cent.
Grand Trunk	25.8 "
Canada Southern	13.2 "
Lake Shore & Michigan Southern	0.8 "

If this was an account simply of the shipments originating in Detroit, it would seem strange that the Lake Shore should receive such an insignificant proportion. But only a very small fraction of the whole is Detroit freight. Most is freight shipped from the West through Detroit, and chiefly that arriving by the Michigan Central and the Detroit & Milwaukee. Of course the Lake Shore's through shipments from points west of Toledo come chiefly over its own road.

PEORIA SHIPMENTS.

Route.	1.	2.	3.	4.	Special.	Total.
Chic., Rock Island & Pac.	....	....	....	437	....	437
Tol., Peoria & Warsaw	....	....	1	9,706	2,872	12,579
Ind., Bloom. & West	18	....	5	9,836	....	9,859
Ill. Midland	....	.	....	....	936	936
Peoria, Pekin & Jack	....	....	....	730	....	730
Total	18	....	6	20,709	3,808	24,541

Here the three upper classes all together for the month make but two full car-loads, and are less than one-tenth of one per cent. of the total. The fourth-class freight is 84.4 per cent. of the whole; the special freights, 15.5 per cent.

The whole amount of freight was sufficient to provide 940 full car-loads daily. This business is not quite one-seventh of the Detroit shipments, but, for a small place like Peoria, it is considerable. At current rates, if all was shipped through to New York, this business would bring the railroads about $4,500 a day.

The actual distribution of this freight among the several lines competing for it was as follows:

Toledo, Peoria & Warsaw	51.26 per cent.
Indianapolis, Bloomington & Western	40.17 "
Illinois Midland	3.82 "
Peoria, Pekin & Jacksonville	2.97 "
Chicago, Rock Island & Pacific	1.78 "
Total	100.00 per cent.

What seems strange here is that the Rock Island road—the old original outlet of Peoria—should have so small a share of the business.

The report of the Chicago shipments for the period from March 11 to April 30 has also been published, showing the following number of tons of each class shipped by each route:

Route:	Class. 1.	2.	3.	4.	Special.	Total.
Mich Cen.	143	44	955	69,986	7,434	78,562
Lake Shore.	103	25	806	62,851	5,845	69,630
P., W. & C.	109	30	1,292	39,239	7,863	48,533
P.,C.& St.L.	2	½	½	22,346	333	22,682
B. & O.	27	7¾	34	13,198	437	13,703¾
	384	107	3,087¼	207,620	21,912	233,110¼

Of the freight 0.16 per cent. was first-class, 0.05 second-class, 1.32 third-class, 89.07 fourth-class and 9.40 per cent. special. The three upper classes altogether formed but 1.53 per cent. of the whole.

The proportion shipped by each road was:

Michigan Central	33.7 per cent.
Lake Shore & Michigan Southern	29.9 " "
Pittsburgh, Fort Wayne & Chicago	20.8 " "
Pittsburgh, Cincinnati & St. Louis	9.7 " "
Baltimore & Ohio	5.9 " "
Total	100.0 per cent.

The average daily shipments (excluding Sundays) were 9 tons of first-class, 2½ of second-class, 71¾ of third-class, 4,828½ of fourth-class and 509½ of special freight, making 5,421 tons in all—enough to load 18 trains daily of 30 cars each.

On this business a difference of five cents per 100 lbs. makes a difference of $5,421 per day, or about $1,700,000 per year, in the net earnings of the railroads.

The most striking fact shown by these reports, of which that for Chicago ought to be fairly representative of Northwestern shipments, is the utter insignificance of the higher classes of freights. It must not be concluded, however, that all freight from the West pays only the lowest rate. In the

first place, live stock, which now pays about two-and-a-half times the fourth-class rate, is not included in the business reported, the division of that traffic being otherwise provided for. Again, in the special freights are included the fresh meat and other refrigerator-car freights, cheese and some other articles which do not figure in any of the other four classes; but the chief exception is cured meats, lard and other hog products, which form an enormous amount of freight from the Northwestern packing cities, and which usually pay considerably more—a quarter or a third more—than fourth-class freight. This is not the case now, however; hog products, like grain, pay the lowest rate—20 cents per 100 lbs. from Chicago to New York. Now, the Northwest has substantially all its freight, except live stock, carried by rail to the East at a price equal to 0.44 cent per ton per mile by the shortest route—a rate which may be good for the shippers, but is eminently disastrous to the carriers.

Grain Receipts at Atlantic Ports.

The receipts of grain at the several Atlantic ports and the proportion of the total at each have been, for the past two years:

	1878.		1877.	
	Bushels.	P. c. of total.	Bushels.	P. c. of total.
New York	40,113,683	45.0	15,148,276	32.5
Boston	6,710,030	7.5	5,125,105	11.0
Portland	1,383,721	1.6	689,493	1.5
Montreal	1,893,149	2.1	1,235,051	2.7
Philadelphia	16,575,910	18.6	7,523,140	16.1
Baltimore	15,686,900	17.6	13,014,884	27.9
New Orleans	6,734,589	7.6	3,855,657	8.3
Total	89,095,982	100.0	46,591,606	100.0

There is an increase in the aggregate of 42,500,000 bushels, or 91 per cent.

The changes since last year are very great, though each of the seven ports shows an increase in receipts. But in the proportion of receipts all places lose except Portland, which is nearly the same, and New York, which has gained enormously.

Comparing New York's percentage with that of Philadelphia and Baltimore taken together, we have:

	1878.	1877.
New York	45.0	32.5
Philadelphia and Baltimore	36.2	44.0

The positions are almost reversed. The two Southern markets received a third more than New York last year; New York has received a quarter more than they this year, as we will see by comparing the quantities:

	1878.	1877.	Increase.	P. c.
New York	40,113,683	15,148,276	24,965,407	165.0
Philadelphia and Baltimore	32,262,810	20,538,024	11,724,786	57.0

Or, if we consider only the increase in the receipts of these three ports, which has amounted to about 36,700,000 bushels, two-thirds or more of it has gone to New York, and only one-third to the other two cities.

Comparing New York and Boston together with Philadelphia and Baltimore, we have the following percentages:

	1878.	1877.
New York and Boston	52.5	43.5
Philadelphia and Baltimore	36.2	44.0
Total	88.7	87.5

We have usually compared these to give some clue to the success of the different railroad lines in carrying grain. But since navigation has opened this purpose is no longer served, as by far the larger part of the receipts at New York are by water. This shows, however, that these four ports together have taken about the same proportion of the grain in both years.

It will be noticed that New Orleans, though its receipts are largely increased in amount this year (60 per cent.), has received a smaller proportion of the total than last year.

During two months of the five for which receipts are given, navigation was open this year, though its effect was hardly felt on receipts except for the last four or five weeks, when the grain shipped by lake early in April began to arrive in New York by canal. For these two months of April and May the receipts at the several ports were:

		P.c. of		P.c. of
	Bushels.	total.	Bushels.	total.
New York	20,120,145	46.4	8,564,065	36.8
Boston	2,273,700	7.5	1,806,768	7.8
Portland	332,261	0.8	255,164	1.1
Montreal	1,861,151	4.3	1,159,851	5.0
Philadelphia	8,508,650	19.6	3,572,290	15.3
Baltimore	6,834,800	15.7	5,715,390	24.6
New Orleans	2,481,459	5.7	2,189,079	9.4
Total	43,412,256	100.0	23,262,607	100.0

The differences between the percentages of the two months and those of the five months are not considerable, so far as the three leading ports are concerned. Montreal first makes something of a figure, and New Orleans falls back. For the last five weeks the influence of the opening of navigation has been fully felt, and in that time New York has received about 52 per cent. of the aggregate receipts of the seven ports; Philadelphia and Baltimore together but 30 per cent.; New Orleans 5 per cent.

The cheapness of rail rates tends to favor the rivals of New York, and the prevalence of corn in the shipments now gives Philadelphia and Baltimore a better opportunity to secure business than if wheat made a larger part of the shipments, as was the case last fall and winter. But the cheapness of the water rate has more than its usual effect now, or more than the effect that it sometimes has had, on account of the low prices of grain, and the fact that the export demand is not pressing, as it was last fall, when the grain had to go forward, and would pay good rates if they were insisted upon. Now the very first consideration seems to be the cheapness of the rate, and time is comparatively unimportant.

THE DISSOLUTION OF THE WESTERN COMBINATION seems not to have been very creditable to the parties at fault. That the combination should have been wrecked was not to be wondered at, but that it should have been wrecked on such an obstacle seems strange indeed. Contrary to general opinion, at the first day's meeting, all were agreed that the combination, or *a* combination, should be continued; that the way to make through freight profitable was to maintain rates, that the way to maintain rates was to take away all motive for cutting by dividing the traffic among the competing roads. Then it remained only to agree upon the proportions of the several roads at the several places. But this *only* proved to be a very big word, when it came to Chicago. That city is a large place and ships more freight than any other in America, perhaps, but this time there was not freight enough there to go around. Three roads are said to have wanted 35 per cent. each, and a fourth remained to be provided for. No one would give way, and on this rock, which can hardly be called a very large one, the combination went to pieces. According to one of Mr. Guilford's reports, the average daily shipments from Chicago for the period from March 11 till April 30 (when the movement was much heavier than it is now and the lake was not open for three weeks of the time) were 5,421 tons. Two of the competing roads get about five-ninths of the freight on this to the seaboard; or at 20 cents per 100 lbs., they get as their share $2.22, and at 25 cents $2.78 per ton. Then with 30 per cent. of it at 25 cents, a road would receive $4,520 per day from Chicago freight, and with 35 per cent. of it at 20 cents it would receive $4,212, or $308 less *gross* earnings. The difference in net earnings would of course be much larger in proportion, depending upon what the actual cost of the through freight is. As we are inclined to believe that there is little or no profit on a 20-cent rate, we would say that there was several times as much profit in the smaller traffic at the higher rate. Now, too, perhaps we shall have something less than a 20-cent rate, if the roads think they can afford that luxury.

MR. VANDERBILT'S RETURN FROM EUROPE has been made the subject of sundry speculations as to great business schemes which he may have undertaken there; but it does not appear that they are anything but speculations, without any confirmation by Mr. Vanderbilt or his associates. The control of the Atlantic & Great Western is one of the assumed objects of his visit; but, though it is rational to suppose that such control may have been sought, it is difficult to see how it could be secured or greatly forwarded by a visit to Europe. The road is in a receiver's hands; the reorganizing committee has no power to transfer the control of the road, (though it might influence it by its recommendations), and the easiest way of securing control of the road would seem to be by purchasing a majority of some class of the bonds, which at the present depressed prices would require a great amount of capital. The securities of the company, however, can be bought without going abroad, though it is possible that personal negotiations with some large holders would simplify the matter. Is is easy to understand that a holder of the class of bonds desired might be glad to agree to keep them and to aid Mr. Vanderbilt to become the controller of the property, and in this way fewer purchases would be necessary, and the market would be less affected by them. That anything of the kind has been done, however, is pure speculation offered only as a possible means of securing control of a company which has yet to be sold to satisfy its creditors, and so cannot be bought or leased in an ordinary way. But without any control, it is natural to expect that the New York Central will receive a larger amount of freight hereafter than heretofore from the Atlantic & Great Western, simply because the two roads now have a favorable connection which formerly did not exist. Now the New York Central is nearly as favorable an outlet as the Erie for Atlantic & Great Western traffic. The report, however, that there are now transfers of some 60 cars of oil daily from the latter road to the New York Central at Salamanca seems to have been a misapprehension, based on pipe-line deliveries at Salamanca from the Bradford oil district.

THE PROHIBITION OF TOO LOW RATES BY LAW has at last been undertaken by the Prussian Ministry of Commerce, which has recently given orders to the executives of the several government railroads to modify as soon as possible their tariffs for the through transportation of wood and timber to and from foreign countries, so that for the two classes under which such materials are carried in Germany shall be charged, for the distance in Germany, in addition to the terminal charge, *not less* than 1.056 cents and 0.775 cent, respectively, per ton per mile. The terminal charge must be 18 cents per ton. This restriction is imposed avowedly to lessen the competition of Austrian and Hungarian with German forest products, and not because the lower rates of the through tariff were unprofitable to the railroads. This matter of the rates on timber was brought up by Prince Bismarck when he applied for authority to establish a separate Railroad Minister in the Prussian cabinet, and has been much discussed in Germany, some of the ablest economists claiming that the limitation of the reduction of the through rates is harmful to the general interests of Germany, however it may be to the wood producers, of which, by the way, the government itself is the chief, as owner of the public forests. The incident is noteworthy as an example of the avowed use of a government's control of railroad rates for the purpose of protection to home industry, without legislative sanction for such protection. As at least part of the timber can enter Germany by water, it may be that the result will be not a diminution of the imports, but simply a diversion of them to the water routes, and the withdrawal of one source of income from the railroads.

THE BELGIAN STATE RAILROADS, of whose cheap transportation so much has been said the world over, really do carry cheaply, but, so far as freight is concerned, at rates which some of our roads recently have not been able to get. The average receipt per ton per mile on these government roads in 1876 (the last year reported) was 0·726 cent. The passenger rates we do not find reported. But the circumstances there permit a much more complete utilization of the cars than on almost any road in this country. Of the entire mileage of cars on the Belgian roads in 1876, 86¼ per cent. was of loaded cars, while on most of our roads of the heaviest traffic 35 per cent. or more of the mileage is of empty cars. This is further indicated by the receipts per train mile in Belgium, which amounted to $1.33 in 1876 (expenses 84 cents), though the trains there are by no means large. Yet they have an average of load of about 165 tons, which is equaled here on a very few roads only, and on most of those only because enormously greater loads are taken in the direction of the heaviest traffic—frequently 400 tons and more. The length of haul in Belgium on the average, in 1876, was about 85 miles. Prices in Belgium are perhaps lower for wages and for most of the materials used by railroads than any where else in the civilized world. The average cost of coal, for instance, appears to have been something less than $2.25 per ton of 2,000 lbs., and steel rails cost about $30 per ton.

AN INTERNATIONAL TRANSPORTATION LAW was the occasion last month of a conference held at Berne, Switzerland, at which were present representatives of most of the continental nations—the German Empire by three Government Councilors, an officer of the Imperial Bureau of Justice, and a member of the General Directory of the Bavarian Transportation Department; Belgium by the Director of the State railroads and an Attorney of the Ministry of Public Works; France by a General Inspector of the French railroads, and an Auditor of the Government; Luxemburg by two Government Councilors and a lawyer; the Netherlands by a deputy; Austria by an officer of the Ministry of Commerce, and one of the Ministry of Justice; Hungary by an officer from the Ministry of Transportation, one from the Ministry of Commerce, and one from the Ministry of Justice; Russia by two delegates, one of whom was an engineer; and Switzerland by the Chief of the Railroad Department and a Professor in the Polytechnic School at Zurich; it also supplied the two secretaries, one a Geneva lawyer, and the other Dr. Christ, a lawyer of Basle, who was the original proposer of the conference. The object is to endeavor to settle upon a uniform code of laws concerning the liabilities of carriers for goods which pass from one country to another in one journey.

NEW YORK SHIPMENTS BY THE ERIE CANAL from the opening down to June 7 have been 58,685 tons, against 48,510 tons last year. The canal was open 54 days this year and but 31 last, so that the average shipments this year have been 1,087 tons this year against 1,565 last year. The chief shipments are anthracite coal, but there are considerable quantities of other freight, some of which is quite valuable freight, as for instance sugar, of which in two weeks 3,500,000 lbs. have been shipped by canal. The whole amount, however, of freight likely at any time to go by rail is not very great, and it must be remembered that the canal competes not only for through freight by the trunk lines, but also for local freight with the New York Central & Hudson River. The amount of through freight diverted from the trunk lines, therefore, must be but a small percentage of the actual through shipments.

MAY EARNINGS, which we reprint this week for fifteen roads, make a very good showing, only two roads suffering a decrease as compared with last year, and eight of the roads showing an increase of more than 20 per cent. Only Western roads appear in the list, however, and no general conclusion can be drawn from the reports yet at hand.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Pittsburgh & Lake Erie.—Extended southeast 6 miles, to Mahoningtown, Pa.

This makes a total of 413 miles of new railroad completed in the United States in 1878, against 570 miles reported for the corresponding period in 1877, 628 in 1876, 296 in 1875, 537 in 1874, and 1,181 in 1873.

The Relative Economy of "Long Runs" and "Short Runs."

We have received from a railroad officer the following tabular report of the result of running engines on the two systems which have come to be designated "long runs" and "short runs." In the one case the engine is run by one set of men and is laid up while the men are resting. In the other case the engine is run as constantly as is possible with new relays of men.

It will be noticed, though, that the record is kept for two different years, so that the conditions were exactly the same in each case. They were probably sufficiently alike not to alter materially the results, which, as will be seen, are very decidedly in favor of the "long runs," the total cost of the latter, including interest on the value of the engines, being 12 per cent. less than for the short runs.

COMPARATIVE PERFORMANCE AND COST OF ENGINES RUNNING PASSENGER TRAINS.

MONTHS INCLUSIVE.	Mileage	Tons of coal	Pints of oil	Pounds of waste	Cost of fuel	Cost of repairs	Cost of stores	Engineers and firemen	Wipers and Dispatchers	Total wages	Total expense of engine	Miles run to one: Ton of Coal	Miles run to one: Pint of oil	Miles run to one: Pound of waste	Cost per mile run for: Repairs	Cost per mile run for: Stores	Cost per mile run for: Fuel	Cost per mile run for: Engineers & firemen	Cost per mile run for: Wiping and disp'g	Cost per mile run for: Total cost
SHORT RUNS, 226 MILES:																				
Nov., 1875, to April 1876	213,737	5,349	13,109	1,789	$10,374.30	$10,174.33	$887.62	$11,963.13	$2,494.00	$14,157.13	$35,593.38	40	16	119	4.76	0.42	4.85	5.46	1.16	16.65
April, 1876, to Sept., 1876	216,927	4,967	12,240	1,680	9,765.40	5,827.77	779.55	11,802.44	2,418.00	14,220.44	30,593.16	44	18	129	2.69	0.36	4.50	5.44	1.11	14.10
Nov., 1877, to April, 1878	185,840	5,638	13,751	1,500	8,279.55	4,203.01	589.38	9,407.88	2,056.25	11,554.13	24,626.07	34	14	124	2.26	0.32	4.45	5.12	1.11	13.25
LONG RUNS, 452 MILES:																				
Nov., 1876, to April, 1877	221,177	6,463	15,864	1,703	11,895.25	5,691.39	920.24	12,033.16	2,431.00	14,464.16	32,970.08	34	14	130	2.58	0.41	5.44	5.44	1.09	14.90
April, 1877, to Sept., 1877	190,062	5,555	15,851	1,444	8,486.55	2,978.96	793.31	9,669.55	1,948.00	11,617.55	23,876.37	34	12	132	1.57	0.42	4.46	5.09	1.02	12.56
SHORT RUNS, 226 MILES:																				
Nov., 1875, to Sept., 1876	396,650	9,508	23,488	3,194	18,523.70	14,459.58	1,540.87	21,630.76	4,552.00	26,182.76	60,706.91	42	17	124	3.65	0.39	4.66	5.45	1.15	15.30
LONG RUNS, 452 MILES:																				
Nov., 1876, to Sept., 1877	376,014	11,080	29,085	2,894	18,834.10	8,552.17	1,567.91	19,874.92	4,004.00	23,878.92	52,833.10	34	13	130	2.27	0.42	5.01	5.29	1.06	14.05
Differences in favor of long runs												— 08	— 64	+ 6	+1.38	— 03	— 35	+ 16	+ 09	+ 1.25

Statement showing the Relative Expense of Motive Power under the "Long Run" and "Short Run" Systems, as demonstrated during the corresponding consecutive eleven months from November, 1875, to September, 1876, "Short Runs," and from November, 1876, to September, 1877, "Long Runs."

PASSENGER SERVICE.

	Long Runs.	Short Runs.	Variation.
Mileage	376,014	396,650	.....
Cost in cents per mile run for—			
Repairs	2.27	3.65	— 1.38
Stores	0.42	0.39	+ 0.03
Fuel	5.01	4.66	+ 0.35
Engineers and firemen	5.29	5.45	— 0.16
Wiping and dispatching	1.06	1.15	— 0.09
Total	14.05	15.30	— 1.25
It requiring 5 engines less in "Long Run Service," add to "Short Run expense" the cost per mile of a 7 per cent. interest for 11 months on 5 passenger engines valued at $8,000 each	.....	0.68	.....
Grand total	14.05	15.98	+ 1.93

The Meeting of the Western Combination Lines.

A meeting of the Western lines who were parties to the plan for dividing east-bound traffic was held on Tuesday and Wednesday of this week at the Windsor Hotel, New York. The following roads were represented: Baltimore & Ohio by John King, Jr., C. M. Wicker, M. L. Doherty and C. A. Shipley; the Pennsylvania Railroad by A. J. Cassatt: the Erie by George R. Blanchard and R. C. Vilas; Pennsylvania Company by J. N. McCullough and William Stewart; Vandalia Line by John E. Simpson; Michigan Central, H. B. Ledyard; Chicago & Alton, J. C McMullin and James Smith; Grand Trunk, L. J. Seargeant; Indianapolis & St. Louis, H. B. Hurlbut; Indianapolis, Cincinnati & Lafayette, M. E. Ingalls; Indianapolis, Bloomington & Western, Geo. B. Wright; Lake Shore & Michigan Southern, John Newell; Atlantic & Great Western, J. H. Devereux; Cleveland, Columbus, Cincinnati & Indianapolis, J. H. Devereux and H. B. Hurlbut; Canada Southern, J. Tillinghast; Ohio & Mississippi, John King, Jr., and William Duncan; Marietta & Cincinnati, John King, Jr., and O. M. Frazer; Louisville & Nashville, M. H. Smith. There were also present L. Millis, Traffic Manager of the Vermont Central; Albert Fink, Trunk Line Commissioner, and N. Guilford, Commissioner of the Western roads.

J. N. McCullough presided, and N. Guilford was Secretary.

The object of the meeting was to take into consideration the report of the committees appointed at the last general meeting of the Western roads in Chicago, in March last. At that meeting the matter of the proportion of each line in a general pooling arrangement for three months was referred to committees consisting of railroad men from each of the main pooling points.

The committees reported on the results of the compact during the last three months. They were of the opinion that the results had been favorable, and that no better policy could be devised than a continuance of the same arrangement for another term. The general drift of discussion was in the same direction. Though instances of failure to carry out the stipulations of the compact were cited, yet the feeling among the principal managers seemed to be in favor of a continuance of the arrangement. An adjournment was had until Wednesday morning, when the work to be done was the fixing of proportions of the several roads at the different points, the former distribution having been only provisional. Everything passed satisfactorily, except the adjustment of the Chicago business. The roads interested in this could not agree, and did not submit the matter to arbitration, whereupon it was decided to adjourn *sine die*, and the combination was dissolved by the expiration of the time for which it was made.

On the first day of the meeting Mr. N. Guilford, the Western Commissioner, offered his resignation. On the second day this resignation was accepted, and a resolution was passed unanimously expressing the satisfaction of the members with the manner in which he had discharged his duties, and their entire confidence in his ability and impartiality.

Report of the Ohio Inspector of Bridges, Etc.

The following is the report of W. S. Williams, C. E., the State Inspector, to Hon. L. G. Delano, Commissioner of Railroads, which is published as an appendix to the commissioner's report for the year ending with June, 1877. Mr Williams' report is dated at Canton, O., Dec. 24, 1877:

During the past year, substantially, all the railroads within the limits of the State have been examined. The road-beds, and especially the bridges and structures, have been carefully inspected. There are bridges with hollow cast-iron top-chords, posts or braces, to which it would be impossible to give an analytical examination without taking the structures apart. A locomotive was used when inspecting a bridge, and where doubts existed as to its strength a test was made under various rates of speed, that the effects of the shock given the structure through the momentum and from the weight of the engine could be determined. Where a structure was deficient in plan of construction or in strength, the error was pointed out; and the merits and advantages were noted and discussed in respect to the greater safety and durability of such as were found firm and well proportioned.

The officers of the several lines rendered such aid and assistance as they could to enable me to make a thorough inspection, and with but one exception all defective structures were promptly remedied. The following comments and suggestions are offered:

ROAD-BEDS.

The material used for ballast consists of gravel, sand, broken stone and furnace cinder. Gravel gives good results if of superior quality, and the road-bed is well thrown up; if not, it will take and hold water, becoming rigid in a severe winter, and in wet seasons some of the ties will churn. Broken stone and furnace cinder give more even results throughout the year, as, where the drainage is good, there is no churning of ties, and very little heaving through the action of frost, and when the rail is once up to a smooth, even surface, trains can be moved with a saving of power and with safety. There are but few roads in the State that use ordinary surface soil for ballast. It makes a fair summer road, which is all that can be said in its favor.

Railroad men are generally agreed as to the fundamental necessity of a good road-bed, and this is being more universally recognized by them each succeeding year. Where the road-bed is well laid up, and ballasted with broken stone, furnace cinder or clean gravel, the rail made of good steel, with angle-bar joint fastenings, and up to a smooth, even surface, it will require but one-half the men to keep it in order that it does with the old iron rail-chair or fish plate joint, ordinary ballast, and the other appliances of a few years ago, and which are still in use upon many roads.

IRON AND STEEL RAIL.

There is considerable iron on roads within the State that has been in use from eighteen to twenty-four years, and still doing good service; but the amount that has been in use five to twelve years, and manufactured within that period, now doing service is comparatively small. A much larger percentage of steel rail is being used each year, not that steel is so much better for ordinary light traffic, but owing in a great measure to demoralization in the iron business and its manufacture.

It is almost impossible to get a good iron rail, probably owing to the fact that for some time past there has not been paid a price warranting its manufacture. It is important during the process of manufacture that the iron be thoroughly worked until all cinder and foreign material becomes excluded, so that the rail may become as near homogeneous as possible. Where this is not done the rail will vary in quality and soon become worthless. Rails have been taken out of the track that had not been in use more than two weeks. Where the joints are not up, or poor ties are used, sliding or flat wheels will very soon cause this species of iron to become useless and unsafe. Owing to the inferior quality of iron furnished, and the many good qualities possessed by steel over iron, together with the small difference in price (being now only about $10 per ton), the reason is obvious why steel rail is fast taking the place of iron. Steel stands the wear of heavy trains, and in almost all respects gives better results. The angle-bar joint fastening now used on several roads is coming into general use. The joint is suspended between two ties, and, the notches to receive the spikes being in the angle-bar, leaves the rail with full strength of flange.

BRIDGES.

As a rule, railroad bridges are now built with more strength and when renewed are rebuilt with increased capacity. The engines now in use are much heavier than those in former years, and it is found that a firm, well-built bridge, having a large factor of safety, requires less care and attention, as, not being constantly strained almost to its full capacity, it will last longer and in every way give better satisfaction.

Within the past year, on nearly all of the roads, a large amount of work has been done in the bridge department, and the bridges have been carefully looked after and examined by the companies. Many have been rebuilt, and a large number strengthened in various ways. Many deck bridges, with two trusses and two tracks, have had the third truss added, and where long-span wood Howe truss structures have given indications of weakness, the arch has been put in, and, when properly constructed, with good results. The arch is made independent of the truss, and when the truss deflects under the load to a fixed point, the arch will take up the remainder of the strain, and transfer it directly to the abutment and piers.

Deck bridges should be well trussed laterally, as the heavier the load placed upon them the more the top-chords will be in compression, and, consequently, the greater the tendency to oscillation. In a through bridge, the greater the load the more the lower chords will be in tension, the steadier will be the bridge, and the less necessity for lateral bracing.

The forests are being rapidly cut away, and the wind encounters less resistance each year, consequently it becomes important for bridge men to carefully consider this point. It is the usual custom in constructing a railroad, to throw embankments across ravines, thus confining the wind (on the same principle of damming up water), with only one opening, the bridge, for its escape. When deck bridges are placed across ravines, where the wind has full force and frequently a concentration of forces, it is highly necessary to have all such structures well braced laterally. Even in well-built deck bridges, the engine and train have a sufficient amount of leverage to cause oscillation, without any assistance from wind; the top chord being in compression, it has a tendency to buckle laterally, as it receives lateral vibration directly from the train.

There are but few deck bridges in the State situated on sharp curves, and orders are given to pass over these structures at a slow rate of speed, usually at about six miles per hour. New roads often run over them, for a while, on the usual schedule time, but it soon becomes apparent that the bridge is unable to bear the shock, and the speed is reduced.

Where timber abutments and piers are used, or the bridge is placed on piles or any other unstable foundation, the bridge has a much greater tendency to become prematurely old, and, if a wood bridge (unless remarkably well constructed), will loose its camber and draw the chords. All bridges should be placed upon substantial masonry. In wood bridges where iron clamps are used, a frequent cause of the drawing of the chords is from an insufficiency of lugs on the clamps; and especially in long spans it will be found that these lugs crush the timbers. Oak and pine do not do well together, as the acid in the oak causes the decay of the pine. A wood bridge lasts much longer when covered and protected from the weather, at the same time it is in more danger from fire. This can be greatly lessened by covering the chords with zinc or galvanized iron, extended well under the angle-blocks, to prevent the accumulation of water at such points.

The simple king-post or A truss is frequently used in short spans, constructed with a transverse piece of timber suspended by rods from the truss, the two-track stringers having each end resting upon the abutment, and supported at the middle by the transverse piece. This transverse piece undergoes a very severe strain, and great care should be taken in the selection of the timber, that it may have sufficient strength and a factor of safety beyond all doubt. The best plan is to reject this form of a bridge altogether.

Long ties, resting upon four stringers, are an improvement upon the two-track stringers, the load being more uniformly distributed over the bridge. The ties are placed close together, and, in case of derailment, the wheels will not push the ties, but pass over smoothly. In addition, a guard-rail is laid to prevent the train going over the side of the structure. This is the standard floor for bridges upon many of the roads, and is being generally adopted throughout the State.

IRON FOR BRIDGES

should be manufactured for that special purpose, using care and judgment from the time the ore is selected at the mine until it passes through the last roll at the mill. Before the iron is used, its tensile and compressive strength should be well known, and the cold bend test applied. In a Howe truss bridge of 107 feet span, built seven years ago, one of the truss rods had dropped through the angle-block into the water below, leaving the nut and a portion of the rod upon the top-chord, the point of fracture being immediately below the nut. This rod and portions of other rods in the bridge, were tested and found not to be of uniform quality—a portion of the rod would break over the anvil, not unlike cast-iron, while other parts of the same rod would stand an excellent cold bend test. On the same road, within six miles, was another Howe truss bridge of 112 feet span. The rods in this bridge had been in use for sixteen years, and there was not a piece of iron in the structure but that would stand the cold bend test. The iron of both these bridges, when placed in the hydraulic press, showed the same tensile strength, averaging about 48,000 pounds to the section of a square inch.

CARE OF BRIDGES.

As a rule, the bridge men look after their structures closely, but in some cases have been negligent—bridges were found out of adjustment, and in some wooden bridges the main braces were almost off from the chords. In other cases there was too much adjusting; the structures were in danger of being pulled to pieces, and the life of the bridge shortened. When a nut is rusted so that it is fixed and will not turn, it does not follow that this member is in proper tension, nor, if the nut turns easily, that it must be turned so long as it can be moved. It requires constant care, judgment, and a knowledge of strains upon the structure, to adjust and keep a bridge in proper condition, and there is no certainty of it so remaining for six consecutive weeks after a careful inspection.

PAINT.

Iron bridges should be so constructed that every part can be reached and well covered with a heavy coat of paint suitable for the purpose. There are portions of a bridge where one-sixteenth of an inch taken off from each side of the web each year, by rust, will very soon render the parts worthless. On new wooden bridges, with heavy timbers not well seasoned, paint should be used with caution, applying at first but a light coat, merely sufficient to prevent the absorption of moisture; not so heavy as to hermetically seal the timber and cause it to take the dry rot from the inclosed sap.

SUGGESTIONS.

On narrow-gauge roads, where 16 and 18-ton engines are in use, the bridges should be built with almost as much capacity as those on standard-gauge lines using 40-ton engines.

There does not seem to be a proper understanding between the road and mechanical departments.

Some of the engines now in use are made with a short cut-off that is very trying to a bridge, from the fact that they cause severe oscillation to the structure.

The master-mechanic will construct a 40-ton engine, placing as much weight as possible upon the drivers—frequently upon a seven-foot wheel base—and consequently his engine is very powerful. This makes a good showing for the mechanical or shop department, but is done at the expense of (and frequently without any consultation with) the road department, as this concentration of a large amount of weight upon one point is very destructive to all kinds of structures. When an engine of this description is contemplated, the road should be properly prepared before the engine is ready for use.

GAUGE.

The gauge of the earlier railroad lines in the State, known as the "Old Ohio gauge," is four feet ten inches; while east and west of Ohio, it was four feet eight and one-half inches. Instead of making the gauge uniform, the broad tread or "*compromise*" wheel is used; and the consequence is, that if, through any blunder, negligence or mistake, a car is run on to a road of different gauge, the train is imperiled by reason of the danger of derailment.

Arrival of the Baldwin Locomotives in Russia.

A correspondent of the *Journal* of the German Railroad Union writes a letter, which we translate as follows, from the Prussian Baltic port, Pillau, under date of March 19 :

The steamer Timur has just arrived with 26 locomotives from the Baldwin Works in Philadelphia, for the Kursk, Kharsov & Azov road and the Orel & Griasi road. At the same time 14 American mechanics arrived in the same ship to erect the locomotives that they may be set to work at the earliest possible moment. We are expecting another steamer, the Bacchus, with the other 14 locomotives. The rapidity of construction of these locomotives is remarkable. The order was put on the order book of the month Dec. 17, 1877. At the end of four weeks four locomotives were ready; at the end of the fifth week, 10; during the sixth 11 were finished; and in the seventh week the whole order was executed. When the order was received at the works, about 1,000 men were employed; this number was increased to 2,400, and the most of them worked no more than the legal ten hours per day, in order to fill the order within the time agreed upon. The transport over the ocean from Philadelphia to Plymouth lasted 16 days; from Plymouth to Pillau, 6 days. Now the locomotives are rolling over the road to Wirballen (the Russian frontier); they are to be completely erected and tested and delivered to the Russian agent. While I am writing this, the work of erection is going forward swimmingly; in about two weeks from to-day it will be finished.

The well-founded fears, due to the present political complications, may have had no little influence on the really astonishingly rapid execution of this order, and also on its transmission, since in case of an unholy war between England and Russia the locomotives could not have reached the latter country and would even have fallen into the hands of the English. To the unwearied, industrious workmen on that side of the ocean, the warmest thanks of a Russian patriot are expressed herewith.

Should these lines come before the eyes of any one of them, may he consider it a moral duty to deliver to his comrades the warmest thanks and greetings from distant Russia for American industry and energy, both of which will always stand high in our opinion, and incite us to emulation.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Ogdensburg & Lake Champlain, annual meeting, at the office in Ogdensburg, N. Y., June 19, at 4 p. m.

Columbus, Springfield & Cincinnati, special meeting in Springfield, O., June 27. The meeting is called to consider proposed modifications in the lease of the road to the Cincinnati, Sandusky & Cleveland Company.

Port Royal, meeting of first-mortgage bondholders at the office of the Union Trust Company, trustee, No. 73 Broadway, New York, June 22, at 1:30 p. m. The meeting is called to determine what shall be done with the road bought in by the trustee at foreclosure sale.

Dividends.

Dividends have been declared as follows:

Evansville & Terre Haute (formerly Evansville & Crawfordsville), 2½ per cent., payable June 1.

Georgia, 3 per cent., semi-annual, payable July 15.

Morris & Essex (leased to Delaware, Lackawanna & Western), 3½ per cent., semi-annual, payable July 1.

New York & Harlem (leased to New York Central & Hudson River), 4 per cent., semi-annual, payable July 1.

New York Central & Hudson River, 2 per cent., quarterly, payable July 15.

Philadelphia, Wilmington & Baltimore, 4 per cent., semi-annual, payable July 1.

Connecticut River, 4 per cent., semi-annual, payable July 1.

Western Union Telegraph, 1½ per cent., quarterly, payable July 15.

Baltimore & Ohio, 25 per cent. on the stock of the Washington Branch, payable June 24. This is in place of five regular semi-annual dividends omitted on account of the tax controversy with the State of Maryland.

Foreclosure Sales.

The *Port Royal Railroad* was sold at Port Royal, S. C., June 6, under foreclosure of mortgage, and was bought in by the Union Trust Company, trustee, for account of the bondholders, the price paid being $500,000. The road is 112 miles long, from Port Royal, S. C., to Augusta, Ga.; its bonded debt is $2,500,000. The Georgia Railroad Company indorsed $500,000 of the bonds, but has recently bought up most of them. As a large bondholder, the Georgia Company will probably have a prominent share in the reorganization.

The personal property of the *Billerica & Bedford Company* was sold at public sale in Bedford, Mass., June 6, by the assignees in bankruptcy, and was bought by B. F. Brown, one of the creditors, for $9,000 in all. The two engines were bid off at $1,000 each, and the nine cars for $1,200 for the lot. The road is of 2 ft. gauge and 8½ miles long. Its cost was about $60,000, and the debt of the company was about $27,000. It has been completed only a few months.

Future sales are noted as follows :

The *Selma, Marion & Memphis* road will be sold under foreclosure at Marion, Ala., July 8. It is completed from a junction with the Alabama Central, 14 miles west of Selma, to Greensboro, Ala., 35 miles. The notice of the sale says : "There will also be sold a few bonds and coupons on Pickens County in this State. Terms of sale: All the property will be sold together for not less than $75,000 ; $10,000 in cash, and the balance to be paid at such time as the Court shall direct, in money or in such State indorsed bonds of the company as shall be allowed by the Register."

The *Paris & Danville* road is to be sold July 10, under a decree granted by the United States Circuit Court. It is completed from Danville, Ill., southward to Lawrenceville, 103 miles, and had, by the latest report, a bonded debt of $2,500,000 and a floating debt of $275,000, with net earnings of $9,289 for the year ending June 30, 1877.

The *Southern Maryland*, a partly-graded line from Washington to Point Lookout, Md., was advertised for sale June 5, but the sale was indefinitely postponed.

Yardmasters' Mutual Benefit Association.

The annual convention assembled in Chicago, June 5, some 75 delegates being present. City Attorney Tuthill welcomed the delegates in a brief address, to which an appropriate answer was made by Mr. H. W. Stager, of Cincinnati.

President M. G. Bedford made the annual address, in which he spoke of the success of the Association. He suggested the formation of a relief fund for sick members. His address was referred to a committee.

A committee on constitution was appointed, to which also all business of a special nature was referred. The Executive Committee reported three assessments during the year, two for deaths and one for the Secretary's salary, making 10 in all since the formation of the Association. The report also recommended the adoption of a uniform height of draw-bar, in order to lessen the danger in coupling cars.

Resolutions were then adopted opposing strikes, and directing the expulsion of any member who should take part in one.

The Treasurer reported 293 members, and a balance of $371.19 cash on hand.

A long discussion followed on the report in relation to draw-bars, which was finally tabled. The question of raising the assessments from $1 to $3 was discussed, and finally indefinitely postponed.

After electing officers, it was decided to hold the next convention in Cincinnati, June 4, 1879.

After adjournment the resident members entertained visiting delegates with an excursion on the Lake, and on the next day with a trip to Lincoln Park and a visit to the Union Stock Yards.

Conference of Railroad Commissioners.

The Railroad Commissioners of Illinois and Missouri held a conference at St. Louis, June 7, at which the following questions were discussed:

First.—The principles on which freight rates are to be determined.

Second.—A uniform classification of freights in the different States.

Third.—A uniform system of reports of railroad companies to commissioners.

Fourth—A convention of all State Railroad Commissioners in the United States.

All these points were freely discussed, and it was agreed that a uniform classification of freights, with such slight variations as circumstances may demand or articles of traffic would indicate, is very desirable, since many of the roads penetrate several different States. Also, that a uniform system of book-keeping be obtained, by instituting a system of uniform reports. As to the convention of Commissioners, it was deemed desirable that it should be held for the purpose of an interchange of views, statistics, etc., upon railroad subjects, and the promotion of uniform, and the prevention of unnecessary and contradictory legislation upon these matters, and Columbus, O., was suggested as a proper place, and Nov. 12 as the time, for such a convention.

ELECTIONS AND APPOINTMENTS.

Ashtabula, Youngstown & Pittsburgh.—At the annual meeting recently, the following directors were chosen: R. F. Smith, Cleveland, O.; A. C. Fisk, H. Hubbard, H. L. Morrison, Ashtabula, O.; F. Harrington, Rock Creek, O.; Warren Packard, Warren, O.; Caleb B. Wick, Youngstown, O.; Wm. Harbaugh, Wm. Mullins, W. H. Barnes, W. P. Shinn, D. M. Landless, Pittsburgh. The road is leased to the Pennsylvania Company.

Atchison, Topeka & Santa Fé.—Mr. George Hackney has been appointed Master Mechanic, in place of H. V. Faries, resigned. Mr. Hackney was recently Master Mechanic at Galesburg, Ill., on the Chicago, Burlington & Quincy.

Baltimore & Potomac.—At the annual meeting in Baltimore, June 12, the following directors were chosen: Samuel Cox, Charles County, Md.; Oden Bowie, B. F. Newcomer, George Small, W. T. Walters, Eli J. Henkle, Baltimore ; A. J. Cassatt, George B. Roberts, Philadelphia. The board reëlected Oden Bowie, President; A. J. Cassatt, Vice-President; John Crowe, Secretary and Auditor; John S. Leib, Treasurer.

Boston & New York Air Line.—At the annual meeting in Middletown, Conn., June 5, the old board was reëlected, as follows: George S. Moulton, Willimantic, Conn.; W. H. Hayward, Colchester, Conn.; J. N. Camp, Middletown, Conn.; H. G. Lewis, Isaac Anderson, New Haven, Conn.; T. L. Watson, Bridgeport, Conn.; Samuel S. Sands, Ripley Ropes, Brooklyn, N. Y.; E. Ellery Anderson, H. B. Hammond, D. B. Hatch, New York. The board reëlected E. E. Anderson, President; H. B. Hammond, General Manager; T. L. Watson, Secretary; D. B. Hatch, Treasurer.

Canton Company.—At the annual meeting in Baltimore, June 12, the following directors were chosen: G. S. Brown, W. B. Harrison, W. B. Brooks, Charles Weber, W. H. Graham, Baltimore; Wm. Mertens, A. B. Baylis, George B. Colgate, George F. Stone, New York.

Cape Girardeau & State Line.—At the annual meeting in Cape Girardeau, Mo., May 18, the following directors were chosen: P. R. Van Frank, Theo. Doyle, S. Albert, L. F. Klosterman, John Ivers, Wm. Woelecke, N. Wichterich, August Bierwirth, Wm. B. Wilson, M. Ditlinger, C. E. Rodney, J. B. Phillipson, Joseph Lansman. All being members of the old board except Wm. Woelecke and M. Ditlinger. The board elected P. R. Van Frank, President; S. Albert, Vice-President; John Ivers, Secretary; Wm. Woelecke, Treasurer.

Cheraw & Chester. — The officers are: W. H. Hardin, President; D. Hemphill, Treasurer; R. J. Latta, Chief Engineer. Offices at Chester, S. C.

Chesapeake & Delaware Canal—At the annual meeting in Philadelphia, June 3, Andrew C. Gray was chosen President, with the following directors: George Cadwalader, H. Pratt McKean, John F. Gilpin, Thos. A. Biddle, Isaiah V. Williamson, Chas. H. Hutchinson, Edwin Swift, David Scull, Mahlon P. Hutchinson, John R. Baker, Charles Dutilh, Gustavus S. Benson, James C. Fisher, Henry C. Ford.

Cheshire.—At a meeting of the board, held June 8, Wm. A. Russell, of Lawrence, Mass., was chosen President, in place of Ephraim Murdock, Jr., who declined a reëlection. Superintendent R. Stewart was then chosen General Manager.

Chicago & Alton.—Mr. J. S. Wood has been appointed Supervisor of Machinery and Cars, a new office.

Chicago, Burlington & Quincy.—Official notice is given of the appointments of Thomas J. Potter to be General Superintendent and C. W. Smith to be Traffic Manager. Both have been heretofore noticed.

Chicago, Milwaukee & St. Paul.—At the annual meeting in Milwaukee, May 8, the following directors were reëlected without opposition: Alexander Mitchell, S. S. Merrill, John P. Plankinton, Milwaukee; J. J. Bowman, Kilbourn City, Wis.; Selah Chamberlain, Cleveland, O.; John M. Burke, David Dows, Peter Geddes, Walter S. Gurnee, Jerome Millbank, Abraham R. Van Nest, Julius Wadsworth, New York; George W. Weld, Boston. The board reëlected Alexander Mitchell President; Julius Wadsworth, Vice-President; R. D. Jennings, Secretary and Treasurer; S. S. Merrill, General Manager; John C. Gault, Assistant General Manager.

The officers of the new Western Union Division (the Sabula, Ackley & Dakota and Dubuque Southwestern roads) are: General Superintendent, D. A. Olin, Racine, Wis.; General Freight and Ticket Agent, Fred. Wild, Racine, Wis.; Auditor, P. Tyrrell, Racine, Wis.; Treasurer, F. G. Ranney, Milwaukee, Wis.; Car Service Agent, W. E. Beecham, Milwaukee, Wis.

Chicago & Northwestern.—At the annual meeting in Chicago, June 6, the following directors (one-third of the board) were chosen: William L. Scott, Erie, Pa.; Jay Gould, D. P. Morgan, Frank Work, C. J. Osborne, New York; J. L. Ten Have, Amsterdam, Holland. Messrs. Morgan, Work and Osborne are new directors, succeeding John Bloodgood, Harvey Kennedy and S. M. Mills. Subsequently David Jones and Perry H. Smith were also chosen directors, in place of James H. Howe and H. H. Porter, resigned. The board reëlected Albert Keep President; M. L. Sykes, Jr., Vice-President, Secretary and Treasurer; S. O. Howe, Assistant Secretary and Assistant Treasurer; Albert Keep, David Dows, W. L. Scott, A. G. Dulman, Jay Gould, D. P. Morgan, Frank Work, Executive Committee.

Of the board now, Messrs. Dows, Scott, Gould, Dulman, Dillon and Flower are also directors of the Chicago, Rock Island & Pacific, and Dows, Scott, Gould and Dillon also of the Union Pacific. The full board now consists of the following: *Term expiring* 1881—William L. Scott, Jay Gould, D. P. Morgan, Frank Work, C. J. Osborne, J. L. Ten Have. *Term expiring* 1880—David Dows, Sidney Dillon, John M. Burke, David Jones, Marvin Hughitt. *Term expiring* 1879—Albert Keys, A. G. Dulman, M. L. Sykes, Jr., R. P. Flower, Perry H. Smith, William H. Terry. Mr. Porter, who retires, first came into the company with the late John F. Tracy, and was one of Mr. Tracy's most trusted friends, and acted for a time as General Manager. His successor, Mr. Perry H. Smith, was Vice-President of the company when Mr. Ogden was President and Mr. Dunlap General Manager.

Chicago, St. Paul & Minneapolis.—Several changes have taken place in the board of directors of this company (successor to the West Wisconsin) and the list is now as follows: H. H. Porter, David Dows, Wm. H. Ferry, R. P. Flower, A. R. Flower, Henry Seibert, R. R. Cable, George Caplin, A. B. Baylis, James B. Goodman, Philetus Sawyer, John Comstock, John C. Spooner.

Cincinnati & Fayetteville.—The officers are: S. J. Bivens, President; T. S. Murray, Secretary; Wm. Roudabush, Treasurer; Joshua Gore, Chief Engineer. Offices at Fayetteville, O.

Flint & Pere Marquette.—At the annual meeting in East Saginaw, Mich., June 5, the following directors were chosen: W. L. Webber, H. C. Potter, East Saginaw, Mich.; H. H. Fish, Philo Remington, Utica, N. Y.; Wm. W. Crapo, Alexander H. Seabury, Edward D. Mandell, W. J. Rotch, New Bedford, Mass.; Jesse Hoyt, New York. The only new director is Mr. Rotch, who succeeds John H. Prentiss, of Chicago.

Georgia.—Mr. J. Cook has been appointed Master Mechanic in place of Wm. Hardman, resigned. He has been Assistant Master Mechanic for some time.

Lehigh & Wilkesbarre Coal Co.—At the annual meeting June 10, the following directors were chosen: J. S. Barnes, G. G. Haven, John Kean, Francis S. Lathrop, Charles Parrish, Frederick A. Potts, Jacob Vannatta. Only two of these, Messrs. Kean and Parrish, were in the old board.

Michigan Midland & Canada.—At the annual meeting in St. Clair, Mich., June 7, the following directors were chosen: Wm. H. Vanderbilt, J. Tillinghast, E. D. Worcester, Cornelius Vanderbilt, Augustus Schell, S. F. Barger, Sidney Dillon, W. T. Scott, E. A. Wickes. The road is controlled by the Canada Southern.

Pennsylvania Company.—At the annual meeting in Pittsburgh, June 5, the following directors were chosen: J. N. McCullough, Wm. Thaw, Thomas D. Messler, Pittsburgh; George B. Roberts, Wistar Morris, S. M. Felton, Harry M. Phillips, J. Price Witherill, Alexander Biddle, J. N. DuBarry, H. H. Houston, Thomas A. Scott, Philadelphia. The board reëlected the following officers: President, Thos. A. Scott; Vice-Presidents, J. N. McCullough, Wm. Thaw, Thos. D. Messler; Treasurer, Wm. H. Barnes; Secretary, Clifford S. Sims.

Rensselaer & Saratoga.—At the annual meeting June 3 the following directors were chosen: George H. Cramer, Joseph M. Warren, George B. Warren, E. T. Gale, Wm. A. Shepard, Thomas White, I. V. Baker, James Forsyth, Wm. H. Hart, Thomas Dickson, Joseph W. Fuller, Ira C. Allen, Wm. H. Vanderbilt. The road is leased to the Delaware & Hudson Canal Company.

St. Louis & Northwestern.—The officers are: President, Dr. J. F. Beebe, Afton, Ia.; Vice-President, J. J. Hardin, Gallatin, Mo.

Saratoga & Schenectady.—At the annual meeting June 3 the following directors were chosen: George H. Cramer, James M. Marvin, E. T. Gale, Joseph M. Warren, S. E. Warren, George M. Tibbitts, T. W. Lockwood, Charles N. Lockwood, LeGrand C. Cramer. The road is leased to the Delaware & Hudson Canal Company.

Sherman & Gainesville.—This company has been organized at Sherman, Tex., with the following officers: President, T. J. Brown; Vice-President, J. M. Lindsay; Chief Engineer, C. J. Ball.

South Pacific Coast.—The officers are: A. E. Davis, President; B. B. Minor, Secretary; Thomas Carter, Superintendent.

Southwestern Railway Association.—At the last regular meeting in St. Louis the following Executive Committee was chosen: J. C. McMullin, Chicago & Alton; C. W. Smith, Chicago, Burlington & Quincy; A. A. Talmage, Missouri Pacific; T. McKissock, St. Louis, Kansas City & Northern; J. B. Carson, Hannibal & St. Joseph.

Texas & Pacific.—Mr. H. J. Small is appointed Master Mechanic in place of John A. Hanglin, deceased.

Vermont & Massachusetts.—At the annual meeting in Boston, June 5, the following directors were chosen: Daniel S. Richardson, Wm. H. Hill, James A. Dupee, Francis Goodhue, George F. Fay, Thornton K. Ware, E. L. Davis. The road is leased to the Fitchburg Company.

Virginia & Truckee.—At the annual meeting recently the old board was reëlected, as follows: W. H. Blauvelt, D. L. Bliss, J. P. Martin, D. O. Mills, I. L. Requa, Wm. Sharon, F. A. Tuttle, B. C. Whitman, H. M. Yerrington. The board reëlected D. O. Mills, President; H. M. Yerrington, Vice-President and General Superintendent; W. M. Thornton, Secretary; Bank of California, Treasurer.

Western Union Telegraph.—Mr. H. McK. Twombly has been chosen a Vice-President, in place of Dr. Norvin Green, now President.

Yardmasters' Mutual Benefit Association.—At the annual convention in Chicago, June 5, the following officers were chosen: President, W. Thompson, Chicago; Vice-Presidents, J. A. Washburn, Concord, N. H., and E. Fitch, Norwalk, O.; Secretary and Treasurer, Joseph Senger, Indianapolis: Executive Committee, J. Averill, E. A. Cooper, J. O. Van Winkle, Indianapolis, Ind.; Edwin Adams, Hannibal, Mo.; E. W. Barber, Buffalo, N. Y.

PERSONAL.

—Mr. W. W. Collier, for some time past Master Mechanic of the Huntingdon & Broad Top and formerly of the Reading & Columbia road, died in Saxton, Pa., June 4. He had been in poor health for some time, but died quite suddenly.

—Mr. George Hackney, late Master Mechanic at Galesburg on the Chicago, Burlington & Quincy, having accepted a position on the Atchison, Topeka & Santa Fe, his friends presented him with a gold-headed cane and a silver tea-set.

—Mr. H. V. Faries, for several years past Master Mechanic of the Atchison, Topeka & Santa Fe, has resigned his position.

—Mr. Wm. Hardman, Master Mechanic, and Mr. A. S. Hill, Purchasing Agent of the Georgia Railroad, have resigned their respective positions.

—Mr. L. P. Farmer, General Passenger Agent of the Pennsylvania Railroad, was married recently in Indianapolis to Miss Boyd, of that city. On their arrival at the Continental Hotel in Philadelphia, June 9, Mr. and Mrs. Farmer found their rooms filled with flowers arranged by their friends as a surprise and greeting.

—Alden B. Stockwell, formerly President of the Pacific Mail and Panama Railroad companies, and a well-known operator on Wall street some years ago, has been adjudged a bankrupt on his own petition.

—Gen. B. L. E. Bonneville, the oldest officer on the retired list of the United States Army, died at Fort Smith, Ark., June 12, aged 85 years. He was well known as an engineer officer and one of the first explorers of the country west of the Rocky Mountains.

—Mr. Thomas Winans, of Baltimore, a son of the late Ross Winans, died at his summer residence in Newport, R. I., June 10, aged 58 years. Mr. Winans learned his trade in his father's shops in Baltimore, and was afterwards sent by him to Russia with some engines. While there he entered into a partnership with Mr. Harrison, of Philadelphia, and the firm received several contracts from the Russian Government, from which they made very large profits. Mr. Winans returned to Baltimore with a large fortune some 20 years ago and has not since engaged actively in business. He was much interested in mechanical pursuits and was constantly inventing something new, the magnificent house he built in Baltimore being full of ingenious contrivances. In 1859, he built what was known as the "cigar steamer," with which he made many experiments, but it was finally abandoned. He also made, early in the war, a steam gun which was the subject of a great deal of talk, but was never actually used. He leaves a son and a daughter, who inherit a large fortune.

—Mr. N. Guilford, formerly General Freight Agent of the Baltimore & Ohio Railroad, who served as Commissioner of the Western railroad combination, to keep the records of the traffic and supervise its distribution, presented his resignation at the meeting June 11. When it was found that the combination would not be continued. Mr. Guilford's resignation was accepted, and a resolution was passed by a unanimous vote commending him for the impartiality and ability with which he had performed the duties of his position.

TRAFFIC AND EARNINGS.

Grain Movement.

Receipts of grain in bushels for the week ending June 1 at the eight Northwestern markets have been, for five years:

1878.	1877.	1876.	1875.	1874
6,556,985	2,835,626	4,936,853	2,641,087	5,324,137

The receipts of the week this year are perhaps unequaled in the history of the grain trade. They are 131 per cent. greater than for the corresponding week last year, and 23 per cent. greater than in 1874 even. Nearly two-thirds of these receipts were corn.

The shipments of these same markets for the week were:

1878.	1877.	1876.	1875.	1874.
5,045,362	2,114,639	4,210,084	2,769,901	5,005,175

The shipments are 139 per cent. greater than last year, but only about the same as in 1874.

Of these shipments the bushels and percentages received by rail were:

2,004,090	824,902	1,797,922	1,080,895	1,296,734
39.7 p. c.	39 p. c.	42.7 p. c.	39 p. c.	26 p. c.

The amount shipped by rail is very large, but not equal to some of the winter shipments.

In 1876, after navigation opened, there were eight weeks that the railroads carried 2,000,000 bushels or more. This is the first week this season that they have carried so much; but there were seven weeks last winter when they carried more.

The receipts of the week at the seven Atlantic ports were:

1878.	1877.	1876.	1875.	1874.
6,847,275	3,260,575	5,665,153	3,535,413	3,625,060

These receipts are 110 per cent. greater this year than last, and 21 per cent. greater than in 1876, when the movement was extraordinary. Indeed, the Atlantic ports probably never before received so much grain in a single week. The largest receipts last fall, when there was an extraordinary demand and an extraordinary supply, were 6,374,999 bushels, for the week ending Oct. 27. This year, during the week ending June 1, 50 per cent. of the total receipts were at New York, 22.2 at Philadelphia. 14.1 at Baltimore, 5 at Boston, 4.8 at Montreal, and 3.9 at New Orleans. Philadelphia's receipts are the largest on record, and Baltimore's has been equaled but once. New York's has been exceeded but once this year, and but four times last year. Of the receipts at Philadelphia 74 per cent. and of those at Baltimore nearly 80 per cent. were corn; of those at New York, only 44 per cent.

The New Orleans receipts since the opening of navigation have been very little greater than last year, in spite of the enormous increase of the general movement. Its receipts for the months of April and May for two years have been:

	1878.	1877.	Increase.	P. c.
New Orleans receipts....	2,481,459	2,189,071	292,388	13.8

Meanwhile the increase in the aggregate receipts of the Atlantic ports has been 86 per cent.

San Francisco wheat exports for May were seven cargoes, 342,207 bushels. For the eleven months of the California crop year ending May 31 the shipments were 6,052,162 bushels.

For the week ending June 10, receipts and shipments at Chicago and Milwaukee are reported as follows:

	Receipts.	Shipments.
Chicago	2,179,086	2,846,936
Milwaukee	237,700	504,100

The receipts are not half as great as those of the preceding week.

The receipts and shipments at Buffalo for the same week were:

	Receipts.	Shipments.
By rail	672,000	991,800
By water	1,924,078	1,586,074
Total	2,596,078	2,578,474

Thus, 26 per cent. of the receipts and 38 per cent. of the shipments were by rail.

The receipts at the four leading seaboard ports for the same week were:

New York	3,052,435
Boston, Philadelphia and Baltimore	2,094,075

Of the receipts at New York, 32 per cent. were by rail. Compared with the previous week, there is a large decrease in the aggregate receipts. The greatest decrease is at Baltimore, which falls behind its average for the year, while the aggregate of the four ports is 46 per cent. above the average.

For the five months from Jan. 1 to June 1, receipts and shipments have been, flour in barrels and grain in bushels:

	1878.	1877.	Increase.	P. c.
Flour:				
Northwestern receipts.	2,485,184	1,750,401	734,783	42.0
" shipments.	2,467,873	1,757,638	710,235	40.4
Atlantic receipts	3,536,857	2,845,987	690,870	24.3
Wheat:				
Northwestern receipts.	25,925,439	7,064,051	18,861,388	267.0
" shipments.	17,968,760	6,587,674	11,381,086	172.9
Atlantic receipts	30,048,307	3,033,716	27,014,591	890.6
Corn:				
Northwestern receipts.	37,313,225	29,241,480	8,071,745	27.6
" shipments.	30,262,981	21,067,618	9,195,363	43.6
Atlantic receipts.	47,344,730	35,136,575	12,208,155	34.8
All Grains:				
Northwestern receipts.	78,112,524	46,486,389	31,626,135	68.0
" shipments.	57,185,390	35,190,657	21,994,733	62.5
Atlantic receipts	89,118,174	46,541,381	42,576,793	91.5

For the five years past the movement of grain of all kinds for the five months has been:

Northwestern Receipts.

1878.	1877.	1876.	1875.	1874.
78,112,524	46,486,389	55,528,548	47,210,000	62,391,296

Northwestern Shipments.

1878.	1877.	1876.	1875.	1874.
57,185,390	35,190,657	47,437,052	30,607,467	42,578,405

Atlantic Receipts.

1878.	1877.	1876.	1875.	1874.
89,118,174	46,541,381	58,020,017	41,374,920	46,583,271

The movement of 1874 was heavier than that of any previous year, but that of 1878 is seen to be 25 per cent. greater in Northwestern receipts, 34½ per cent. greater in Northwestern shipments, and 91 per cent. greater in Atlantic receipts.

The Atlantic receipts for these 22 weeks this year are equal to those of the first 37 weeks of 1877—till the middle of September.

The May receipts of grain, including flour and meal reduced to bushels, at New York, have been for two years:

	1878.	1877.	Increase.	P. c.
By rail	5,367,744	3,894,542	1,473,202	37.8
By water	10,939,026	2,479,606	8,459,420	341.1
Total	16,306,770	6,374,148	9,932,622	156.0
Per cent. by rail	32.9	61.1	.....	.....

The larger amount and proportion arriving by water is accounted for largely by the earlier opening of navigation. The canal boats were coming throughout the month of May this year, but not to any extent for more than a week or so last year. The June arrivals by water last year were 65 per cent. of the total, nearly as large a proportion as in May this year. During two months last year, while navigation was open throughout the month, the proportion of rail shipments reached 40 per cent. During two months it fell below the proportion of May last.

Coal Movement.

Coal tonnages for the five months ending June 1 were reported as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Anthracite:				
Philadelphia & Reading	1,372,536	2,299,087	D. 926,551	40.3
Northern Central, Shamokin Div., and Summit Br. R. R.	225,658	231,497	D. 5,839	2.5
Danville, Hazleton & Wilkesbarre	8,615	6,561	I. 2,054	31.1
Pennsylvania Canal	64,120	103,219	D. 39,099	37.9
Central of N.J., Le'h Div.	760,080	1,220,042	D. 459,962	37.7
Lehigh Valley	1,111,229	1,603,191	D. 492,682	30.7
Penn. & New York	9,593	20,870	D. 11,277	54.0
Del., Lacka. & Western.	707,739	890,106	D. 182,367	20.5
Del. & Hudson Canal Co.	789,657	895,346	D. 105,689	11.8
Pennsylvania Coal Co	263,659	415,563	D. 151,904	36.6
State Line & Sullivan	12,795	4,858	I. 7,937	163.4
Total anthracite	5,325,681	7,691,060	D. 2,365,379	30.8
Semi-bituminous:				
Cumberland, all lines	497,609	533,475	D. 35,866	6.7
Huntingdon & Br'd Top.	57,174	60,251	D. 3,077	5.1
East Broad Top	27,088	20,863	I. 6,225	29.8
Tyrone & Clearfield	493,032	553,289	D. 60,257	10.9
Bellefonte & Snow Shoe	11,812	18,917	D. 7,105	37.6
Total semi-bitu's	1,086,715	1,186,795	D. 100,080	8.4
Bituminous:				
Barclay	124,443	140,947	D. 16,514	11.7
Allegh'y Region Pa. R.R.	79,290	83,277	D. 3,987	4.8
Penn and Westmoreland gas coal	293,206	313,584	D. 20,378	6.5
West Pennsylvania R. R.	84,364	80,809	I. 3,555	4.4
Southwest Penn. R. R.	11,549	18,118	D. 6,569	36.3
Pitts'rgh Region, Pa. R.R.	166,755	156,799	I. 9,956	6.3
Total bituminous	759,597	793,534	D. 33,937	4.3
Coke:				
Penn and Westmoreland.	26,179	.....	.....	.....
West Pennsylvania R. R.	32,127	.....	.....	.....
Southwest Penn. R. R.	314,614	.....	.....	.....
Pitts'rgh Region, Pa. R.R.	36,878	.....	.....	.....
Total coke	409,798	373,746	I. 36,052	9 6

The tonnage in each case is only that originating on the line to which it is credited. For most of the figures we are indebted to the *Engineering and Mining Journal.*

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the five months ending June 1 was:

	1878.	1877.	Decrease.	P. c.
Coal Port for shipment	719	9,153	8,434	92.2
South Amboy for ship't.	191,982	276,409	84,427	30.5
Local distribution on N. J. lines	65,762	74,171	8,409	11.3
Co.'s use on N. J. lines	32,918	33,454	536	1.6
Totals	291,381	393,187	101,806	25.9

Of the total this year 206,188 tons were from the Lehigh and 85,193 tons from the Wyoming Region.

Shipments of coal from Pictou, N. S., from the opening of navigation to June 1, were 13,749 tons.

Petroleum Exports.

The exports of petroleum from the several ports for the five months from Jan. 1 to June 1 have been, in gallons:

	1878.	1877.	1876.	1875.
New York	65,039,981	81,955,881	43,803,070	50,505,577
Boston	1,174,975	1,571,029	923,872	1,030,102
Philadelphia	13,072,215	17,341,905	23,167,001	14,873,142
Baltimore	11,992,517	10,889,162	15,530,572	10,339,829
Richmond	.....	1,374,400	.....	.....
Portland	500	1,389,804	.....	.....
Total	91,279,878	114,522,181	83,424,515	76,743,650

This year the exports are 20 per cent. less than last year, but greater than in any previous pear.

The percentage of exports from each leading point for each of the four years has been:

	1878.	1877.	1876.	1875.
New York	71.3	71.6	52.5	65.8
Boston	1.3	1.4	1.1	1.4
Philadelphia	14.3	15.1	27.8	19.3
Baltimore	13.1	9.5	18.6	13.5
	100.0	97.6	100.0	100.0

In 1877, 2.4 per cent. of the exports were from Richmond and Portland.

The chief change this year is the large gain (in proportion) at Baltimore, most of which is at the expense of Richmond and Portland, which no longer appear as exporters.

Delaware Fruit Traffic.

The shipments of strawberries over the Delaware Railroad up to June 8 were 593 car-loads. The season is now nearly closed and shipments of fruit will be light until the peach season opens.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending Jan. 31:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Paducah & Elizabethtown	$340,265	.....	.....	.....
Expenses	282,197	.....	.....	.....
Net earnings	$58,068	.....	.....	.....
Earnings per mile.	1,832	.....	.....	.....
P. c. of expenses	82.90	.....	.....	.....

Five Months ending May 31:

	1878.	1877.			
Atchison, Topeka & Santa Fe	$1,247,382	$850,940	I.	$396,442	46.6
Bur., Cedar Rapids & Northern	692,516	359,292	I	333,224	92.7
Central Pacific	6,407,410	6,354,472	I.	52,938	0'8
Chi. & Alton	1,646,536	1,672,760	D.	26,224	1.6
Chi., Mil. & St. Paul.	3,021,000	2,369,929	I.	1,251,071	52.8
Denver & Rio Gr.	347,224	248,635	I.	98,589	39.7
Grand Trunk	3,735,491	3,683,173	I.	52,318	1.4
Ill. Cen., Ill. lines	2,044,732	1,787,845	I.	256,887	14.4
" Spring. Div.	74,220	.....	.....	.....	.....
" Iowa lines	633,746	504,116	I.	129,630	25.7
Kansas Pacific	1,210,111	1,092,393	I.	117,718	10.8
Missouri, Kansas & Texas	1,048,246	1,172,810	D.	124,564	10.6
St. L., I. Mt. & Sout'n	1,612,238	1,657,977	D.	45,739	2.8
St. Louis, Kan. City & Northern	1,304,442	1,240,611	I.	63,831	5.1
St. Louis & Southeastern	442,684	408,281	I.	34,403	8.4
Toledo, Peoria & Warsaw	536,155	418,493	I.	117,662	28.1
Wabash	1,893,880	1,705,223	I.	188,657	11.1

Four Months ending April 30:

Clev., Mt. V. & Del.	$120,443	$113,137	I.	$7,306	6.5
Net earnings	26,323	20,518	I.	5,805	28.3
P. c. of expenses	78.44	81.96	D.	3.52	4.3
Dakota Southern	67,305	49,377	I.	17,928	36.3
Net earnings	37,568	.....	.....	.....	.....
P. c. of expenses	44.19	.....	.....	.....	.....
Gal., Har. & San Antonio	355,721	303,853	I.	51,868	17.1
Kansas Pacific	928,620	845,841	I.	82,779	9.8
Net earnings	277,315	347,137	D.	69,822	20.1
P. c. of expenses	70.10	58.95	I.	11.15	18.9
Louisville, Cincin. & Lexington	274,445	306,570	D.	32,125	10.5
Net earnings	52,888	53,702	D.	814	1.5
P. c. of expenses	80.86	82.37	D.	1.51	1.8
Louisville & Nash'e.	1,705,200	1,659,167	I.	46,033	2.8
Net earnings	612,656	577,653	I.	35,003	6.1
P. c. of expenses	64.08	65.19	D.	1.11	1.7
Missouri, Kansas & Texas	841,489	941,503	D.	100,014	10.6
Net earnings	131,521	331,035	D.	199,514	60.3
P. c. of expenses	84.37	64.83	I.	19.54	30.1
Nash., Chat. & St. L.	605,303	564,908	I.	40,395	7.2
Net earnings	226,963	226,297	I.	666	0.3
P. c. of expenses	62.54	59.93	I.	2.61	4.4
Paducah & Memphis	66,732	57,275	I.	9,457	16.5
Net earnings	15,536	11,107	I.	4,429	39.9
P. c. of expenses	76.75	81.00	D.	4.25	5.2
St. Louis, Iron Mt. & Southern	1,344,138	1,368,290	D.	24,152	1.8
Net earnings	519,271	596,956	D.	77,685	13.0
P. c. of expenses	61.37	56.38	I.	4.99	8.8
Wabash	1,493,627	1,347,734	I.	145,893	10.8
Net earnings	413,981	253,496	I.	160,485	63.6
P. c. of expenses	72.27	81.17	D.	8.90	10.9

Month of March:

Erie	$1,147,208	$1,170,714	D.	$23,506	2.0
Net earnings	321,838	373,569	D.	51,731	13.8
P. c. of expenses	71.96	68.13	I.	3.83	5.6

Month of April:

Gal., Harrisburg & San Antonio	$90,682	$70,430	I.	20,252	28.8
Gt. West., of Can	305,900	334,000	D.	28,100	8.1
Net earnings	37,000	68,700	D.	31,100	45.3
P. c. of expenses	87.68	79.43	I.	8.25	10.4

Month of May:

Atchison, Topeka & Santa Fe	$291,400	$189,914	I.	$101,486	53.4
Bur., Ced. R. & Nor.	139,490	71,605	I.	67,885	94.8
Central Pacific	1,574,000	1,554,652	I.	19,348	1.2
Chicago & Alton	357,365	311,266	I.	46,099	67.6
Chi., Mil. & St. Paul.	799,000	607,141	I.	191,859	31.6
Denver & R. Grande	86,959	68,053	I.	18,906	27.8
Ill. Cen., Ill. lines	444,255	369,495	I.	74,760	20.2
" Spring. Div.	17,646	.....	.....	.....	.....
" Iowa lines	132,267	95,028	I.	37,239	39.2
Kansas Pacific	281,491	246,552	I.	34,939	14.1
Missouri, Kansas & Texas	206,757	231,307	D.	24,550	10.6
St. Louis, Iron Mt. & Southern	268,100	289,687	D.	21,587	7.2
St. Louis, Kan. City & Northern	258,132	227 178	I.	30,954	13.6
St. L. & Southeast.	93,049	79,829	I.	13,220	16.5
Tol., Peoria & War.	111,339	85,011	I.	26,328	31.0
Wabash	400,253	357,489	I.	42,264	11.8

Week ending June 1:

Grand Trunk	$149,297	$149,046	I.	$251	0.2

Central Pacific earnings are compared with 1876 as follows:

	1878.	1876.	Inc. or Dec.	P. c.
May 1	$1,574,000	$1,757,414	D.	$183,414	10.4
Five months	6,407,410	6,380,674	I.	26,736	0.4

THE SCRAP HEAP.

Railroad Manufactures.

Kaufman, Klinger & Co. are running their forge at Ellendale, Pa., making about 100 tons of charcoal blooms per month.

The Terre Haute Car Works, at Terre Haute, Ind., are busy on an order for 500 box cars for the Erie & Pacific Dispatch.

The Ohio Falls Car Co., at Jeffersonville, Ind., has in hand three chair cars for the Missouri Pacific; three sleeping coaches and two postal cars for the Alabama Great Southern. Also passenger cars for the Utah Northern, Min-

nesota Midland, Peoria, Pekin & Jacksonville, and a small order for box cars.

The Southern Pump & Pipe Co., at Chattanooga, Tenn., is turning out a large number of pumps.

Riehle Brothers, of Philadelphia, have put in a 50-ton track scale for the Phœnix Iron Works, at Phœnixville, Pa.

D. G. Gautier & Co. will, about July 1, remove their steel and spring works from Jersey City, N. J., to Johnstown, Pa. The new works are much larger than the old.

The Kensington Iron & Steel Works of James Rowland & Co., in Philadelphia, have suspended payment. It is probable that the creditors will grant an extension.

Some Philadelphia parties have bought the old Paradise Furnace property, in Huntingdon County, Pa., including 5,000 acres of land. They will rebuild the furnace, which was built in 1821, but has not been in blast for some years.

The Roane Iron Co., at Chattanooga, Tenn., made its first steel June 6, when six tons were turned out as an experimental cast. The steel is made by the Siemens-Martin process from iron made at the company's furnace near Cartersville, Ga. The steel works will turn out 150 tons per day when in full operation.

A company called the Hall Manufacturing Co. has been organized at Grand Rapids, Mich., to manufacture the concave or ∩ rail invented by Major Lowell Hall, of that city. The officers are: W. G. Beckwith, President; W. D. Tolford, Vice-President; John M. Hoon, Secretary; Henry W. Hinsdale, Treasurer. Arrangements to roll the rails have been made with the Indianapolis Rolling Mill.

The Indianapolis Rolling Mill has been making iron rails for an extension of the Cincinnati, Rockport & Southwestern road.

The Edgar Thomson Steel Works have just delivered a lot of steel rails to the Terre Haute & Indianapolis road.

The Wason Manufacturing Co., at Brightwood, Mass., is building 20 cars for the New York Elevated road, passenger cars for the Housatonic, the Utica & Black River and the Rochester & State Line roads, and a number of open excursion cars for the Brooklyn, Flatbush & Coney Island road. The works employ about 400 men.

C. B. Salmon, General Manager of the Eclipse Wind Mil Co., of Beloit, Wis., reports an increasing demand abroad. The company has averaged this year three foreign shipments a month. There were sent recently 10 mills to Vienna, Austria, and some smaller orders, and there is now a very large Australian order in the factory. Contracts are being closed with a Russian railroad contractor and with a company in Bombay, India. The factory is running with a full force, and making 125 mills a month.

Bridge Notes.

The Keystone Bridge Co., of Pittsburgh, has an order for an iron truss bridge 400 feet long, single track, over the Lehigh River at Coalport on the Lehigh & Susquehanna Division of the Central Railroad of New Jersey.

The Edgemoor Iron Co., at Wilmington, Del., is building an iron bridge at Ashland, Pa., on the Delaware Western road. The company has also closed a contract with the Receivers of the Atlantic, Mississippi & Ohio for three iron bridges on that road, one over New River having six deck spans of 129 ft. each, triangular truss; one for two spans, 45 ft. each, deck girders, and the third for six spans, 27 ft. each, deck girders.

The Passaic Rolling Mill Co., at Paterson, N. J., continues full to overflowing with work. The company has closed a new contract with the New York Elevated road for 4,000 tons of work on Third Avenue from Sixty-first to One-hundred-and-first street. It has also the order to roll the 700 tons of iron for the roof of the new Seventh Regiment Armory in New York, and the beams for two other large buildings in New York, making about 6,000 tons for delivery in the next four months.

Notes.

We are apt to think the locomotive of the present day an improvement on its predecessors, but in every round house will be found some conservative old veteran, who stoutly maintains that these "new-fangled rattle-traps" are of no account, and who will tell how he used to "go up the Bungtown grade with old No. 7, forty mile an hour, with six cars and steam a-blowin' the whole way." Nevertheless if "old No. 7" could be resuscitated from the scrap heap, it is very doubtful if the veteran would be willing to give up his present engine and go back to the old one.

An enthusiast in profanity should travel in a freight caboose; on one trip he would hear more new "cuss-words" than he could use to advantage in a month.

An invention really needed is an automatic ticket agent, warranted able to answer thirty-five questions at once, find change for a $50 bill, give each one of seventeen passengers his ticket first, listen unmoved to indefinite abuse of himself and the company, and make up a correct return of the tickets sold at the same time. For small local stations a variety would be useful which could, at one and the same time, receive two telegraph orders, put out a signal, change a switch, sell tickets for the next train and explain the mysteries of the freight tariff to an irate granger.

An exchange says that the following conversation lately occured in a New England railroad station: Pat—"Phat is the fare to Putnam?" Agent—"Putnam in Massachusetts or Connecticut?" Pat—"Phat is the fare?" Agent—"$5 to Putnam, Mass., $8 to Putnam, Conn." Pat—"Well, bedad, Oi'll take the cheapest."

The Biggest Plow in the World.

The Dubuque (Ia.) *Herald* says: "About a month ago the Chicago, Milwaukee & St. Paul Railroad Company gave an order to the celebrated plow manufacturers, Hirschheimer & Barclay, of La Crosse, Wis., for a plow to be built according to drawings furnished, which should be the largest plow in the world. When at La Crosse the other day, we were invited to see the monster on the stocks and to take its measurements. The plow being now ready for delivery we give some weights and dimensions which will enable one to form some idea of it. The share weighs 382 pounds, the moldboard 180 pounds, the beam 900 pounds, the coulter and clasp 180 pounds, the clevis 60 pounds, the standard 134 pounds. The sizes of the principal parts are: the beam is 16½ ft. long, 10 in. wide and 17 in. thick: the land-slide is 9 ft. × 5 × 2 in., the standard 40 in. × 7 × 1½ in., the moldboard 8 ft. by 26 in., the share 5½ ft. × 12 in. It will cut a furrow 37 in. wide, and is expected to go through any obstruction which comes in its way. The plow will be shipped to George W. Sanborn, Superintendent of the Iowa & Minnesota Division of the Chicago, Milwaukee & St. Paul Railway, Mason City, Iowa, and will be used in railroad construction, the team attached to it being a locomotive. The railroad company look upon it as an experiment, but the builders are confident it will prove a success, and will vastly cheapen the ditching of railroads across our broad prairies."

Prices of Rails.

Steel rails continue to be quoted at $42 to $44 at mill, and iron rails at $32 to $36. Sales are noted of 6,200 tons steel on private delivery. The Erie is said to be in the market for some 20,000 tons of steel rails for third rail and renewals. Old rails are quoted at $17 to $18 in New York, with no business to speak of.

OLD AND NEW ROADS.

Alliance & Lake Erie.—This company has filed articles of incorporation in Ohio for a line from Alliance, O., north through Stark, Mahoning, Portage, Trumbull, Granger and Lake counties to Fairport. It is successor to the Lake Erie, Alliance & Wheeling, sold out under foreclosure, and has 24 miles of narrow-gauge road finished.

Annapolis & Elkridge.—On behalf of the State of Maryland proceedings have been begun to enjoin the trustees from selling this road under foreclosure of the first mortgage. It is charged that the mortgage was authorized in the first place by the votes of directors not legally elected; that it is not valid, and that the bonds issued were not used for the benefit of the company, but to forward the schemes of the Baltimore & Drum Point Company, which claims to hold a controlling interest in the stock. The State, as a large stockholder, asks to have the sale enjoined and the mortgage itself set aside and declared void.

Atchison, Topeka & Santa Fe.—The land sales for May were 86,000 acres and for the five months ending May 31 they were 502,851 acres, against 23,700 acres for the month and 103,137 for the five months in 1877.

A dispatch from Topeka, Kan., says that the United States Court has decided that this company has a right to its location through the Grand Cañon of the Arkansas on its San Juan Extension. The company filed a map of the location last year, and it was approved by the Secretary of the Interior. The Denver & Rio Grande claimed a prior right to build through the cañon on its special charter granted by Congress. It would be impossible, it is said, to build a second line through the cañon, except at an enormous expense.

Baltimore & Ohio.—At a special meeting in Baltimore, June 10, the stockholders voted unanimously to accept the provisions of the act passed by the Maryland Legislature last winter as a settlement of the questions at issue between the State and the company in regard to taxation. We have heretofore published a summary of the act, which now takes full effect. It provides for a payment in bonds in full settlement of all back claims by the State, and for a future payment of one-half of 1 per cent. yearly on the gross earnings of the road in Maryland, in lieu of all other taxation.

Boston, Concord & Montreal.—The survey of the proposed branch from Bethlehem, N. H., to the Profile House in the White Mountains has been completed. The distance is 9½ miles, and the highest grade required will be 116 feet to the mile.

Boston & Northwestern.—A new survey is being made of this projected line. It is to leave the Fitchburg road in Weston, about 11 miles from Boston, and to run across all the other lines entering Boston from the westward to the South Boston flats. It will be about 15 miles long, and its object is to make at South Boston a general freight terminus.

Buffalo, Corry & Pittsburgh.—On June 8 all trains were withdrawn from this road, which has been worked by the Allegheny Valley, Mr. A. H. Barney, purchaser of the road at the recent foreclosure sale having begun a suit against the Allegheny Valley and attached a number of its cars. The suit is for a deficiency in the proceeds of the foreclosure sale, but it is said that it results from the transfer of the Allegheny Valley's Buffalo business from the Buffalo, Corry & Pittsburgh to the Buffalo & Southwestern road. The road is 43 miles long, from Corry, Pa., to Brocton, N. Y. It was sold in bankruptcy several years ago and bought by Wm. Phillips, then President of the Allegheny Valley Company, and has since been counted among the assets of that company, though Mr. Phillips' heirs claimed that the legal title was in his estate. The recent foreclosure was of a mortgage given to secure notes issued by Mr. Phillips for the purchase money.

A deputation of parties living on the line of the road visited New York June 10, to see if arrangements could not be made to keep the line in operation. It is said that Mr. Barney, the purchaser, offered to sell it for $75,000, and the committee applied to Mr. Wm. H. Vanderbilt to see if he would be willing to buy it and work it. Mr. Vanderbilt is said to have agreed to do so, provided the Pennsylvania Railroad Company would also take a share, or would agree to send a certain proportion of the through business from the Allegheny Valley line over the road. The committee then went to Philadelphia to see President Scott.

Canada Southern.—Notice is given that the new mortgage for $14,000,000 made to Augustus Schell and Cornelius Vanderbilt, trustees, has become a first lien on the property of this company. In pursuance of the scheme of arrangement, as authorized and confirmed by act of the Canadian Parliament, holders of the debenture certificates heretofore issued, or which may hereafter be issued by the company, can exchange them for bonds issued under the new mortgage at the office of the Union Trust Company in New York.

The Detroit *Free Press* says: "Several new steam vessels are in contemplation, all of which will be built at or near Detroit, probably. The most important of the lot will be one to be built for the Canada Southern Railway, for use in transferring cars near the Lime Kilns. The general features of this boat were decided upon a long time ago, but now the specifications and minute drawings are being prepared and probably ere long the work of building will be commenced. The boat will be a side-wheeler, 257 feet long, 267 feet over all, 39 feet width of actual hull, 64 feet wide over all, and 14 feet depth of hold. She will be built for two tracks, each track to hold eight cars. Her frames and sides will be of iron and the bottom of wood. Light draught will be the point sought. As soon as the plans and specifications are completed, advertisements will be inserted in the principal lake papers calling for bids for her construction."

Central, of New Jersey.—At a meeting of the board, held June 12, the plan of reconstruction was formally approved, and the forms, etc., for the new bonds were settled. It was announced that 85 per cent. of the entire amount of securities is represented in the signatures to the agreement.

Central Vermont.—The St. Albans (Vt.) *Messenger* of June 6 says: "At the last term of the United States Circuit Court in the district of Vermont an important case was heard by Judge Wheeler. Hon. Francis A Brooks of Boston, a holder of the old Vermont Central bonds, had brought suit in the United States Court to foreclose the first mortgage and get the trustees removed, having first exhausted every effort that he could think of for obtaining a short cut to justice in the State courts. His suit was met with the plea that the United States Court had no jurisdiction, because the property was under the control of the Court of Chancery in Franklin County, and there should not be a conflict of authority. Mr. Brooks demurred to this plea, and so the question of jurisdiction was argued as above mentioned. Judge Wheeler has just filed his decision, sustaining Mr. Brooks' suit, and ordering the railroad managers and the trustees of the mortgage to answer it upon its merits. This looks to a comparatively early and just solution of the long and vexatious problem, and if Mr. Brooks does not sell out his bonds nor tire of the fight he will have the honorable distinction of carrying off the colors."

Chicago & Michigan Lake Shore.—The holders of considerably more than the requisite two-thirds of all the bonds of this company, having assented to the agreement dated May 10, 1877, for the reorganization of the securities of this company, notice is given that it is determined to proceed to a sale of the property at once. Those bondholders who have not assented to the agreement, and desire to participate in the benefits thereof, are requested to send their address without delay to Charles Merriam, agent of the committee of trustees, No. 26 Sears' Building, Boston, by whom full information will be given.

Chicago, Milwaukee & St. Paul.—The following circular is issued:

"The Dubuque Southwestern Railroad (running from Farley, Ia., to Cedar Rapids, Ia., a distance of 56 miles,) having been purchased by the Chicago, Milwaukee & St. Paul Railway Company, that road, together with the Sabula, Ackley & Dakota Railroad (running from Sabula to Marion, a distance of 87 miles), will be known hereafter as the Chicago, Milwaukee & St. Paul Railway—Western Union Division.

"All business of the Dubuque Southwestern Railroad prior to and including May 21, 1878, will be settled with D. A. McKinlay, Secretary, Dubuque, as heretofore; after that date the business of the road will be conducted by the officers of the Western Union Division."

Chicago & Pacific.—Receiver Whitman reports for March and April as follows:

Balance, March 1		$15,738.30
Receipts		33,463.25
Total		$49,201.55
Disbursements on Receiver's accounts	$30,717.11	
Disbursements on old accounts of company	1,557.10	
		32,274.21
Balance, May 1		$16,927.34

The receipts were $1,189.04 in excess of the disbursements.

Chicago, Quincy & Western.—Meetings have been held in aid of this proposed road and a considerable amount secured in subscriptions to its stock. The section to be built is from Quincy, Ill., eastward to Beardstown to connect with the Springfield Division of the Baltimore & Ohio. The distance is about 50 miles, and the line is not far from that of the Wabash road. The object is to secure a competing line east from Quincy.

Chicago & Lake Huron.—The Detroit *Free Press* of June 9 says: "The affairs of this company are fast getting to be in a decidedly interesting condition. This is the line that is so much talked about as being the Chicago connection of the Grand Trunk Railway. It runs now from Port Huron to Valparaiso, Ind. Recently there have been rumors that Vanderbilt was seeking to get control of the section of the road between Flint and Lansing, known as the Chicago & Northeastern Railroad, and owned by a different organization than that operating the rest of the road. Some months ago Wm. R. Bowes commenced a suit against that company and others, including Wm. H. Vanderbilt, on that theory, charging that a collusion had been made between the directors and certain of the bondholders to sell the road so as to cripple the Chicago & Port Huron.

"May 29 Charles B. Peck, Receiver of the Chicago & Lake Huron road, commenced a suit in the United States Circuit Court for this district against the Chicago & Northeastern Company and James M. Turner, President, and William Hamilton, Secretary. In his bill of complaint he alleged that Jan. 16, 1878, an agreement was made between the President (Turner), and Wm. L. Bancroft, who was then Receiver of the Chicago & Lake Huron road, by which the Northeastern road was to continue to be operated as a part of the whole line; the Lake Huron road was to pay all expenses, keep the track and other property in perfect repair, and pay the Northeastern road a certain rent. This, it is claimed, was intended to mean that the whole road was to be operated and run as one line. In pursuance of such agreement, the Receiver of the Lake Huron road entered into large contracts for freight traffic Jan. 22. Peck was appointed Receiver, vice Bancroft resigned; and April 12 he was notified that the board of directors of the Chicago & Northeastern road would not recognize the contract made by the President (Turner) except up to the time when Bancroft resigned, that they repudiated the contract altogether as after that date, and that after June 1 they would run and operate their own road, and threatened to stop all traffic unless the Lake Huron road would pay arbitrary, exorbitant rates. The bill asked for an order restraining the Northeastern Company from interfering in any way with the traffic over the road. Such an order was granted.

"The answer of the Northeastern Company denied the authority of the Receiver to make the contract except for the time he was Receiver. It alleged that the arrangement was only temporary, and distinctly understood between Bancroft and Turner to be temporary. The answer of Turner alleges that it was expressly stated between himself and Bancroft that he (Turner) did not have authority to make the arrangement, and that it would have to be ratified by the board of directors. That the board of directors did repudiate such action, and that on May 22 they notified the Receiver of the Lake Huron road that they proposed, after June 1, to run their own road, and had procured the necessary rolling stock to do such business.

"On Saturday a motion to dissolve the restraining order was argued before Judge Brown by Ashley Pond, of Detroit, for the Northeastern road, and Anson E. Chadwick, of Port Huron, for the Lake Huron road. The Judge, after some deliberation, dissolved the order, and the road will run its own cars until something else happens."

Cincinnati & Fayetteville.—This company has filed notice of a change of terminus of its proposed line from Fayetteville in Brown County to a point in Athens County; also of increase of capital stock from $120,000 to $750,000. The line as amended will be about 150 miles long.

Corpus Chisti, San Diego & Rio Grande.—The financial troubles of this company having been settled, work has been resumed and track is now being laid from Banquette, Tex., toward Precenos. Two boarding cars have been fitted up for the workmen on the road.

Denver & Rio Grande.—This company has closed a contract with Carlile, Orman & Crook, for the grading of its road from Alamosa, Col., to Santa Fé, N. M., a distance of 140 miles, the work to be finished in five months.

Detroit & Bay City.—The contract for building the branch from Vassar, Mich., to East Saginaw has been let to D. L. Wells & Co., of Milwaukee, the work to be done by Sept. 1. It is to be built by a separate company known as the Detroit, Bay City & Saginaw, but it will be worked as a branch of the Detroit & Bay City.

Detroit & Milwaukee.—The Detroit *Post and Tribune* of June 8 says: "The most important point in the foreclosure case was decided by Judge Reilly yesterday, practically in favor of the second-mortgage bondholders. The holders of first-mortgage bonds claimed that their mortgage covered

the entire property and franchise of the road, and, therefore, the whole thing must be sold as an entirety, and their claims satisfied in full, before any subsequent incumbrancers could get anything. But the mortgage, though specifying right of way, track, bridges, culverts, buildings, says nothing about rolling stock. Judge Reilly, therefore, held that it does not cover rolling stock. He thinks the omission to mention rolling stock was intentional, and was so understood at the time the mortgage was executed. This decision will still further strengthen the friends of the Great Western scheme, who have now, it appears, pretty much everything in their own hands."

Eastern.—The Boston *Advertiser* says that the Superior Court has granted an injunction restraining this company from running trains over the Swampscott Branch. The branch is four miles long, from Swampscott, Mass., to Marblehead. The suit arises from some claims for land damage, for which the claimants are not willing to take certificates of indebtedness.

Elberton Air Line.—The contract for completing this road from Elberton, Ga., to Toccoa City is held by Col. P. P. Dickinson, of New York, and he has sublet to W. A. Potts a contract for dressing up the road-bed and laying the ties and iron. The rails are being rolled at Atlanta, and two engines, two passenger and 20 freight cars are nearly completed.

Houston & Texas Central.—The Houston Daily *Telegram* of June 5 says that the notes of this company, given out a year ago under the plan of liquidation, aggregating over $80,000, and maturing on the 4th of June, were promptly paid at the Treasurer's office in Houston on that date.

Illinois Central.—The Land Department reports that during the month of May 3,904.08 acres of land were sold for $27,959.23. The cash collected on land contracts was $3,839.74.

The traffic on the Main Line in Illino's (707 miles) was $444,255 against $369,494.88 in May, 1877. There was also an increase on the Iowa Division of $37,239.19, making the gain on the entire line for the month $111,999.31. In addition to the above the Springfield Division earned in May (as estimated) $17,646.

Indianapolis & Springfield.—Mr. Charles F. Hatch, now General Manager of the Minneapolis & St. Louis, and formerly of the Lake Shore and Eastern roads, has begun suit in the United States Circuit Court at Indianapolis to recover from this company $60,000 for work done by him while contractor for the building of the road. He asks also that subscribers to the company's stock may be compelled to pay up their subscription, and a number of them are joined as defendants in the suit.

Iowa Railroad Classification.—The Executive Council of Iowa has completed the annual classification of the railroads of the State as follows: Class A, Chicago, Rock Island & Pacific; Chicago, Burlington & Quincy; Chicago & Northwestern; Kansas City, St. Joseph & Council Bluffs. Class B, Burlington, Cedar Rapids & Northern; Chicago, Milwaukee & St. Paul; Central of Iowa; Keokuk & Des Moines, and Iowa Coal & Railway Company. Class C, all other roads in the State. The classification is made by gross earnings, and the roads in Class A are limited to a passenger rate of 3 cents per mile, while those in Class B can charge 3½ cents, and in Class C 4 cents per mile.

Iowa Railroad Projects.—Surveys are being made for a new narrow-gauge road from Sibley, in Osceola County, Ia., eastward on a line parallel to and some 10 miles south of the Minnesota line to a point on the Central road north of Mason City. The distance is about 130 miles, and it is said that an offer to grade it for $1,000 a mile has been made.

A company has been organized to build a road from Sac City in Sac County south some nine miles to Wall Lake, on the Maple River Branch of the Chicago & Northwestern.

A company has been formed to build a road from Lakin in Webster County east by north to Hampton in Franklin County, about 50 miles. The towns on the line are asked to vote a five per cent. tax.

Kankakee & Southwestern.—This company has filed articles of incorporation in Illinois for a railroad from Kankakee on the Illinois Central southwest to Strawn on the Chicago & Paducah, about 55 miles. The capital stock is to be $500,000. Several of the incorporators are connected with the Illinois Central.

Kansas Pacific.—It is announced that the Union Pacific has secured practical control of this road and that a pooling agreement has been concluded. It is said that the pool is to include the Colorado Central, and that earnings are to be divided in the proportion of 71 per cent. to the Union Pacific, 19 per cent. to the Kansas Pacific, 6 per cent. to the Colorado Central and 4 per cent. to the Omaha Bridge. It is also said that no change will be made in the present management of the road.

Massachusetts Central.—At a special meeting in Boston, June 6, after some discussion, it was voted that, whereas, the road had cost up to the present time a sum greatly in excess of its market value, in order to cover the loss so far as practicable, and place the company in a position to complete the road within two years, the holders of capital stock shall transfer the same to a trustee till the expiration of the two years, when, if the road is completed for trains its entire length, three-fourths in amount of said stock shall be subject to the order of the directors of the road upon the trustee, who shall by such order deliver the remaining one-fourth of said stock to the present holders; the right to vote upon the whole of the stock shall remain with the present owners during the continuance of said trust.

It was also voted that, as it was important that prompt action should be taken, the President and Messrs. Brigham and Cotting be a committee to bring the matter to the immediate notice of the stockholders, and to such persons in the towns along the road, that town meetings may be held for the proper action of the towns holding stock.

Montgomery & Eufaula.—A recent circular from the trustees under the first mortgage says: "Of the $1,280,000 of these bonds outstanding, $1,168,000 of them have been surrendered to the selected depository—the Union Trust Company. The bonds not surrendered belong to persons who are absent from the country or who cannot be found. The trustees forthwith caused proceedings to be had in the courts of Alabama, under which a decree was entered for the sale, on Nov. 12, 1877, of the railroad, and all the property affected by our mortgage, in the interests of the reorganization scheme. In this decree of sale it was explicitly provided that the sale should be made subject to the claim or lien of the South & North Alabama Railroad Company, amounting, with interest to the present date, to about $64,000, as it might be eventually determined, upon the appeal taken from a judgment theretofore had in favor of that company. The South & North Railroad Company, however, took an appeal to the United States Supreme Court that necessarily postponed the sale until that court shall render its decision. * * Pending the determination of the United States Supreme Court, the properties of the company remain in the possession of A. J. Lane, Esq.—one of your trustees, as Receiver—and have been efficiently operated and cared for by him. The Receiver, at a recent meeting of the trustees, stated that the road was in excellent running order and well equipped for business, and further reports that the earning capacity of the road has been largely increased by certain connections, and promises to be yet more enlarged at no very distant day. The Receiver has during the past six months paid off all the Receiver's certificates, principal and interest, amounting to $54,318, gold. These certificates were issued in September, 1872, and constituted a prior lien to the first-mortgage bonds.

New Orleans Pacific.—This company has apparently given up the purpose of selling its own bonds and retaining the Louisiana State bonds issued in aid of its construction. It has been advertising for proposals for the purchase of $250,000 State bonds, the first installment of the aid.

New York, Lake Erie & Western.—Work has been begun on the extension of the third or standard-gauge rail from Waverly, N. Y., eastward to Binghamton, 41 miles. This is to complete the connection with the Albany & Susquehanna, and through that road with the new Boston, Hoosac Tunnel & Western.

It is stated that as soon as the third rail is laid to Binghamton work will be begun on its extension to Jersey City, to complete the line of standard gauge from Buffalo.

North & South, of Georgia.—The amount of $40,500 necessary to complete the purchase of this road from the State has been raised in Columbus, Ga. The parties purchasing the road will at once organize a new company, and make arrangements to extend the road to a connection with the Atlanta & West Point.

Peninsular, of Virginia.—Books have been opened for subscriptions to the stock of this company, which received a charter from the last Legislature of Virginia. The road is to run from Newton, Md., the terminus of the Worcester & Somerset road, south by west down the Eastern Shore to Cherrystone, Va., a distance of 64 miles. The route is through the centre of a narrow and thinly-inhabited peninsula, everywhere intersected by creeks and bays so that no part of it is more than a mile or two from water transportation.

Pennsylvania.—Parties interested in slate quarries in Northampton County, Pa., are negotiating for the building of a branch from this company's Belvidere Division at a point near Belvidere, N. J., west by north to Bangor, Pa., about 10 miles. The cost, including a bridge over the Delaware, is estimated at $150,000, and it is said that the Pennsylvania will take an issue of $100,000 bonds, provided cash subscriptions of $50,000 are secured to the stock.

Pittsburgh & Lake Erie.—The track on this road is laid to Mahoningtown, Pa., 18 miles southeast from Youngstown, O., and the iron bridge over the Shenango River at that point is completed. The Pennsylvania Company, however, has not quite finished the lowering of its tracks at that point so as to allow the construction of the crossing of the new road on a bridge, as agreed, and some delay in the work may be caused. This over-head crossing makes a good deal of filling necessary on the new road.

Resumption of Land Grants—The House Committee on the Public Lands has made a favorable report on the bill to forfeit certain lands granted to aid in the construction of certain railroad and telegraph lines. The committee say: "The immediate effect of the passage of this bill will be to remit back to the mass of the public lands, to be made a part of the domain of the United States and subject to speedy actual settlement, nearly, if not quite, 100,000,000 acres of the public lands granted by Congress to States and corporations to aid in the construction of certain railroad and telegraph lines, and which have not been earned by said States and corporations, but which have been forfeited by their failure to perform the conditions of their respective grants. A large portion of these grants have been withdrawn and withheld from settlement for more than 20 years, thereby defrauding of their rights an army of home-seeking settlers and the public treasury of the millions which would have resulted from the development of the vast domain thus withheld from settlement and cultivation. It is clearly in the power of Congress to enact this bill into a law, and it is its bounden duty to put an immediate stop to speculation on the public faith by corporations, to confirm to settlers the titles to their hard-earned homes, to raise the embargo of grasping monopolies, and bid the great army of emigration to go forward."

It is true that a great many companies have not built roads by which they were to earn the land within the time prescribed by the terms of the grant. But probably in nearly every case the land grant had very little present value; otherwise the roads would have been built. Usually, too, there has been little difficulty in securing a renewal of a grant when it has been suffered to lapse; but in these cases the renewal has usually appeared to be the best thing for the government. If there were any considerable demand for the land there would be other companies competing for it and offering to take less land for doing the same work.

St. Louis & Northwestern.—A company by this name has been organized to build a narrow-gauge road from Chillicothe, Mo., north by west to Storm Lake, Ia., a distance of about 230 miles.

Sherman & Gainesville.—This company has been organized to build a narrow-gauge road from Sherman, Tex., west to Gainesville, about 30 miles. Surveys of the line have already been begun.

Southern Pacific.—The Senate Military Committee has reported in favor of permitting this company to build its road across the military reservation at Fort Yuma, Arizona, which was opposed by the Texas & Pacific Company. The bill granting the right of way gives with it land for stations, shops, wharves, etc.

South Pacific Coast.—Track on this road has been laid for some time, but it was first opened for business last week between Alameda, on San Francisco Bay, and San Jose, 40 miles, connection between San Francisco and Alameda being made by ferry. The track is laid to Los Gatos, 13 miles beyond San Jose, but regular trains will not run to that point at present. Work is progressing on the tunnel at Los Gatos, which must be finished before further progress can be made on the extension to Santa Cruz.

Terre Haute & Southeastern.—This company has filed articles of incorporation in Indiana for a line from Terre Haute, Ind., southeast to Clay City in Clay County, about 26 miles. The line is covered by some eight or ten other incorporations.

Toledo & Ann Arbor.—The completion of this road was marked by a little fight, the Canada Southern trying to prevent the laying of a crossing over its track at Alexis, O. The Toledo & Ann Arbor people, however, having the largest force, succeeded in getting their crossing laid, and at once procured an injunction restraining the Canada Southern from interfering with it. They state that the arrangements for the crossing had been completed beforehand, and that the Canada Southern officers had been consulted, and made no objection.

Viroqua.—This company was lately organized to build a road from Viroqua, Wis., northward to Sparta, and quite a contest is going on for local subscriptions between it and the La Crosse & Viroqua, an older organization, which purposes building a line to La Crosse. Viroqua is the centre of a well-settled farming country and its trade is thought to be worth some effort, and accordingly the La Crosse Company is raising subscriptions among the merchants of La Crosse. The Viroqua Company is said to have the support of the Chicago, Milwaukee & St. Paul Company; it claims that its line to Sparta will cost much less than one to La Crosse.

Walla Walla & Columbia River.—The San Francisco *Evening Post* says: "Portland (Oregon) advices of the 30th state that arrangements have been made between the Walla Walla & Columbia River Railroad Company and Messrs. J. C. Ainsworth, R. R. Thompson, S. G. Reed, W. S. Ladd, C. E. Tilton and Dr. D. S. Baker, for the purpose of building a general system of narrow-gauge railroads to meet the requirements of the grain-producing counties bordering on the upper Columbia and Snake rivers, and that the Walla Walla & Columbia River Railroad will become part of the new enterprise, and that the work of extending the same will be commenced as soon as practicable. It is also stated that in July or August next there will arrive in Portland 35 miles of light rails, with a locomotive, rolling stock, etc., for the same enterprise."

Washington City, Virginia Midland & Great Southern.—The Alexandria (Va.) *Gazette* of recent date says: "The Circuit Court for the city of Alexandria, Judge Keith presiding, made an order yesterday giving John S Barbour, Esq., Receiver of the Virginia Midland railroad, authority to enter into a contract with the Charlottesville & Rapidan Railroad Company to lease the proposed railway from Orange Court House to Charlottesville, Va., upon such terms as may be settled to the satisfaction of all the parties concerned."

Waxahachie Tap.—This road is to be 12 miles long, from a point on the Houston & Texas Central, 3½ miles north of Ennis, Tex., to Waxahachie, the county seat of Ellis County. It is all graded and the right of way and depot grounds settled for. The company is out of debt and has on hand as assets $36,400 bonds of the town of Waxahachie, to be issued as the track is completed; $14,000 in notes and land subscribed and the State land grant of 150 sections. The company is about to make arrangements for the iron.

Western Union Telegraph.—The company's statement (partly estimated) for the quarter ending June 30 is as follows:

Surplus, April 1	$186,859.49
Net earnings	869,018.59
Total	$1,055,878.08
Interest, rentals, etc	170,000.00
Surplus	$885,878.08

From this the usual quarterly dividend of 1½ per cent. was declared, which will leave a surplus of $359,942.08.

Zulia & San Jose de Cucuta.—A company which is building a railroad from the River Zulia to San José de Cucuta in the State of Santander, United States of Colombia, is now offering for sale in New York an issue of $200,000 7 per cent. bonds. The road is to be of one meter gauge and about 33 miles long; it is to be built on the line of an existing cart road, now owned by the company, over which there is a large traffic, chiefly in coffee carried down for export, and in manufactures and other imports returned. The estimated cost of the road is $500,000, and the company is allowed by the State 3½ years in which to complete it.

ANNUAL REPORTS.

Pittsburgh, Cincinnati & St. Louis.

During the year 1877 this company worked the following lines:

	Miles.	
Pittsburgh, Cincinnati & St. Louis, owned:		
Pittsburgh, Pa., to Newark, O.	159.5	
One-half of 33 miles from Newark to Columbus	16.5	
Cadiz Branch	8.1	
Total owned		184.1
Chartiers R. R., leased, Mansfield, Pa., to Washington		22.8
Cincinnati & Muskingum Valley, leased, Dresden, O., to Morrow		148.4
Little Miami, leased, Columbus to Cincinnati	120.4	
Xenia, O., to Richmond, Ind	56.2	
Xenia to Springfield	19.3	
		195.9
Columbus, Chicago & Indiana Central, leased, Columbus to Indianapolis	187.7	
Bradford Junction, O., by Logansport to Chicago	231.0	
Richmond, Ind., by Logansport to State Line	161.8	
		580.5
Total leased		947.6
Total worked, including the entire 33 miles between Newark and Columbus		1,148.2

The 33 miles from Newark to Columbus are owned and used in common with the Central Ohio, whose line is leased by the Baltimore & Ohio. The company also owns one-third interest in the St. Louis, Vandalia & Terre Haute road, which is leased to the Terre Haute & Indianapolis.

The company is controlled by the Pennsylvania Company, and its lines form the southern group or system of the Pennsylvania lines west of Pittsburgh. Its equipment is as follows:

	P., C. & St. L.	L. M.	C. & M. V.	C., C. & I. C.	Total.
Locomotives	101	39	14	163	317
Passenger cars	31	38	9	61	139
Postal and baggage cars	26	15	4	28	73
Box cars	1,749	419	52	869	3,089
Stock cars	413	140	39	320	912
Flat and gondola cars	298	117	263	428	1,106
Caboose cars	39	11	4	55	109
Service cars	7	...	1	...	8

The Chartiers road has no separate equipment. During the year 1,000 box cars were added to the equipment through a car trust. No other considerable changes are reported, but 6 passenger, 10 baggage and 98 freight cars are reported as destroyed in the Pittsburgh riots.

The general account, condensed, is as follows:

Stock ($45,829 per mile)		$8,437,200.00
Funded debt ($67,942 per mile)		12,508,080.99
Deferred liabilities		1,387,150.93
Current liabilities		724,174.09
Total ($125,239 per mile)		$23,056,586.01
Road and equipment ($108,323 per mile)	$19,942,294.81	
Deferred assets	518,651.91	
Betterments to leased roads	644,951.72	
Current assets, cash, etc	1,218,155.56	
Securities	403,354.25	
Balance, deficiency of assets	329,177.76	
		23,056,586.01

The deferred liabilities are accounts with leased lines for supplies and assets turned over at the time of the lease. A considerable change has been made in the capital account through the surrender of bonds held by the Pennsylvania Company, as shown in the income account below. The only additions to cost of road were $5,460.29 for new equipment.

PITTSBURGH, CINCINNATI & ST. LOUIS.

The work done on the main line and Cadiz Branch, 200.6 miles, was as follows:

Train mileage:	1877.	1876.	Inc. or Dec.	P. c.
Passenger	587,825	721,889	D. 134,064	18.6
Freight	1,841,679	2,149,279	D. 307,600	14.3
Other	59,027	81,696	D. 22,669	27.7
Total	2,488,531	2,952,864	D. 464,333	15.7
Passenger car mileage	3,317,754	3,828,472	D. 500,718	13.1
Freight car mileage	34,080,537	37,565,459	D. 3,484,922	9.3
Passengers carried	680,082	786,903	D. 106,821	13.6
Passenger mileage	28,622,579	42,253,185	D. 13,630,606	32.3
Tons freight carried	1,722,386	1,808,761	D. 86,375	4.8
Tonnage mileage	236,678,578	249,969,881	D. 13,291,363	5.3
Average train load:				
Passengers, No	48.69	58.53	D. 9.84	16.8
Freight, tons	128.50	116.30	I. 12.20	15.0
Per train mile:				
Receipt	127.51 cts.	113.70 cts.	I. 13.81 cts.	12.2
Net earnings	44.25 "	29.15 "	I. 15.10 "	51.8
Per passenger per mile:				
Receipt	2.46 "	2.14 "	I. 0.32 "	15.0
Net earnings	0.71 "	0.71 "	.. ..	....
Per ton per mile:				
Receipt, local	1.22 "	1.26 "	D. 0.04 "	3.2
" through	0.74 "	0.66 "	I. 0.08 "	12.1
" average	0.93 "	0.88 "	I. 0.05 "	5.7
Net earnings	0.29 "	0.15 "	I. 0.14 "	93.3

There was a notable increase in freight train load and a consequent decrease in expenses per ton per mile. The proportion of empty cars hauled was 21.32 per cent. in 1877 and 24.11 in 1876. The rates were marked by an increase in through and a decrease in local rates. Freight expenses decreased, chiefly owing to the greater train load and reduction in other expenses. The average freight train consisted of 20.97 cars in 1877, and 19.57 in 1876.

The earnings of this line were as follows:

	1877.	1876.	Inc. or Dec.	P. c.
Freight	$2,191,781.88	$2,193,115.95	D. $1,334.07	0.1
Express	63,044.61	54,891.98	I. 8,152.63	14.9
Passengers	704,602.88	905,602.54	D. 200,999.66	22.2
Mail	126,779.75	92,251.92	I. 34,527.83	37.4
Rents, etc	11,753.34	18,658.89	D. 6,905.55	36.9
Total	$3,097,962.46	$3,264,521.28	D. $166,558.82	5.1
Expenses	2,022,913.25	2,427,694.99	D. 404,781.74	16.7
Net earnings	$1,075,049.21	$836,826.29	I. $238,222.92	28.5
Gross earn. per mile	15,443.48	16,273.78	D. 830.30	5.1
Net earn. per mile	5,359.17	4,171.62	I. 1,187.55	28.5
Per cent. of exps.	65.30	74.37	D. 9.07	12.2

The falling off in passenger traffic and earnings was in through business, and due to the absence last year of the Centennial traffic carried the previous year. The decrease in local freight rates and the loss in bulk of traffic was very nearly balanced by the gain in through rates. Increased economy and the benefit of the greater train loads are seen in the lessened expenses and the gain in net earnings.

The income and profit and loss accounts (condensed) are as follows:

Net earnings		$1,075,049.21
Interest received		10,230.80
Total		$1,085,280.01
Interest on floating debt	$75,848.05	
Rent, Monongahela Extension	37,500.00	
Interest on bonds	669,790.00	
Loss on Little Miami lease	308,436.69	
" Cincinnati & M. V. lease	79,114.05	
Proportion of loss on St. L., Vandalia & T. H	46,375.86	
		$1,217,064.65
Loss for the year		$131,784.64
Balance, Dec. 31, 1876		6,031,207.23
Old accounts, etc		110,820.73
Total		$6,273,812.60
C., C. & I. C., old accounts	$13,785.79	
Profit on Union Depot bonds sold	37,200.00	
Sundry accounts	26,927.13	
Consolidated bonds surrendered by Pennsylvania Company in accordance with arrangement made	2,500,000.00	
Interest on same unpaid	87,500.00	
Acceptances surrendered by Penna. Co	3,279,221.92	
		$5,944,634.84
Debit balance, Dec. 31, 1877		$329,177.76

During the year 39 miles of track were ballasted, 111,925 new ties and 4,666 tons steel rails laid, leaving but 33 miles of iron in the main track. The buildings destroyed in the July riots at Pittsburgh have been replaced, except the office building.

LEASED LINES.

From the complete and carefully arranged tables in the report of Mr. Thomas D. Messler, Comptroller and Assistant to the President, the following figures are taken for the traffic of these lines:

	Chartiers.	Cin. & M. V.	Little Miami.	C., C. & I. C.
Mileage of line	22.8	148.4	195.9	580.5
Train mileage	50,900	414,200	1,141,465	3,827,600
Passengers carried	113,879	184,769	925,564	652,767
Passenger mileage	1,319,093	3,767,011	21,442,173	31,795,297
Tons freight carried	89,714	246,603	584,645	1,521,141
Tonnage mileage	1,319,093	14,752,093	45,877,993	254,492,612
Per ct. inc. or dec. in pass. mileage	D. 8.41	I. 3.90	D. 9.11	D. 15.78
Per ct. inc. or dec. in ton mileage	I. 52.81	I. 50.90	I. 11.24	D. 7.44
Earn. per train mile	156.86 cts.	90.16 cts.	115.03 cts.	90.64 cts.
Net " "	86.20 "	6.36 "	28.61 "	12.15 "
Receipt per pass. per mile	3.17 "	2.67 "	2.21 "	2.53 "
Cost per pass. per mile	1.58 "	3.93 "	2.04 "	2.33 "
Receipt per ton per mile	3.71 "	1.71 "	1.46 "	0.90 "
Cost per ton per mile	1.69 "	1.31 "	1.17 "	0.86 "
Inc. or dec. in pass. rate	D. 0.10 "	D. 0.14 "	I. 0.16 "	I. 0.02 "
Inc. or dec. in ton rate	D. 0.97 "	D. 0.40 "	I. 0.09 "	I. 0.05 "

A slight improvement in rates was made, especially on the Columbus, Chicago & Indiana Central, where the through rate, though only now 0.7 cent per ton per mile, was 16.6 per cent. greater than in 1876. This increase was, however, offset by a decreased bulk of traffic, except on the Cincinnati & Muskingum Valley, where there was an unusual grain traffic. The earnings of these lines were as follows:

	Chartiers.	Cin. & M. V.	Little Miami.	C., C. & I. C.
Freight	$30,681.53	$251,556.99	$671,649.57	$2,293,410.68
Passeng'rs	41,793.19	100,535.15	473,866.58	805,180.25
Mails, etc.	4,692.42	14,681.72	150,563.79	297,664.65
Total	$77,167.14	$366,773.86	$1,296,079.94	$3,396,255.58
Expenses	34,760.49	340,887.91	973,743.23	2,940,915.35
Net earn.	$42,406.65	$25,885.95	$322,336.71	$455,340.23
Inte't, etc.	.....	.....	109,444.00	.....
Total	$42,406.65	$25,885.95	$431,780.71	$455,340.23
Rent's, etc.	42,406.65	105,000.00	740,217.40	455,340.23
Loss for the year	.....	$79,114.05	$308,436.69	.....
Gross earn. per mile.	$3,384.52	$2,471.52	$6,616.00	$5,850.58
Net earn's per mile.	1,859.94	174.43	1,646.45	784.39
Per ct. of exps	45.05	92.94	75.13	86.59
Per ct. inc. or dec. gr. earn.	D. 0.01	I. 13.80	I. 10.30	D. 1.80
Per ct. inc. or dec. net earn.	D. 4.10	.....	I. 42.30	I. 18.30

The Cincinnati & Muskingum Valley earned less than its expenses in 1876. The net earnings of the Columbus, Chicago & Indiana Central are paid into court pending the litigation over the lease of the road.

St. Louis & Southeastern.

This company's lines are as follows:

	Miles.
East St. Louis, Ill., to Evansville, Ind	160.8
O'Fallon Branch	5.9
Shawneetown Branch	41.5
Total, St. Louis Division	208.2
Kentucky Division, Henderson, Ky., to Guthrie	98.0
Tennessee Division, Guthrie to Nashville, Tenn	47.0
Total	353.2

There are 39.41 miles of sidings on the whole road. The St. Louis and Kentucky divisions are separated by a river transfer 11 miles long down and across the Ohio. Of the Tennessee Division 9.8 miles, from Edgefield Junction to Nashville, are owned and used in common with the Louisville & Nashville. The road is in the hands of receivers pending suits for foreclosure of mortgage, Gen. J. H. Wilson being Receiver of the St. Louis and Tennessee and St. John Boyle of the Kentucky Division, but they are operated as one line. The latest report is for the year ending Oct. 31, 1877.

The equipment consists of 48 engines; 16 passenger, 5 combination and 7 baggage cars; 365 box, 62 stock, 654 eight-wheel coal, 132 four-wheel coal, and 23 caboose cars: 97 gravel dump cars. During the year 130 four-wheel coal cars were bought, 1 caboose built and 3 eight-wheel coal cars destroyed.

The bonds and stock issued by the company are as follows:

Stock ($30,694 per mile)		$10,841,100
St. Louis Division, first mortgages	$3,355,000	
Kentucky Division, " "	1,000,000	
Consolidated bonds	5,145,000	
Total bonds ($26,897 per mile)		9,500,000
Total ($57,591 per mile)		$20,341,100

There are also $4,355,000 consolidated bonds held by trustees to replace the prior bonds. Of the St. Louis Division bonds $2,250,000 are a first lien on the road from East St. Louis to Shawneetown; $1,000,000 on the road from McLeansboro to Evansville, and $105,000 on the O'Fallon Branch. Of the consolidated bonds issued $2,330,500 were sold, $2,364,500 hypothecated and $450,000 pledged on account of Tennessee Division. The unpaid coupons and the interest on Tennessee Division certificates amount to $1,254,115. The indebtedness accrued since Jan. 1, 1874, for equipment, supplies, labor, etc., is $626,634.51, of which $267,434.44 has been paid by the Receivers, leaving $359,200.07 still due.

The work done was as follows on the entire line:

Train mileage:	1876-77.	1875-76.	Inc. or Dec.	P. c.
Passenger	486,554	492,104	D. 5,550	1.1
Freight	739,051	683,808	I. 55,243	8.1
Total	1,225,605	1,175,912	I. 49,693	4.2
Locomotive mileage	1,250,560	1,228,364	I. 22,196	1.8
Pass. car "	1,373,491	1,426,608	D. 53,117	3.7
Freight car "	6,124,307	5,220,802	I. 903,505	17.3
Passengers carried	260,538	272,578	D. 12,040	4.4
Passenger mileage	9,456,470	10,282,428	D. 825,958	8.0
Tons freight carried	673,582	617,996	I. 55,586	9.0
Tonnage mileage	30,212,395	27,422,541	I. 2,789,854	10.2
Average train load:				
Passengers, No.	19.44	20.89	D. 1.45	6.9
Freight, tons	40.88	40.10	I. 0.78	1.9
Average rate:				
Per passenger per mile	3.50 cts.	3.32 cts.	I. 0.18 ct.	5.4
Per ton per mile	2.38 "	2.58 "	D. 0.20 "	7.7

The freight train earnings were 98 cents gross and 23 cents net per mile; passenger 77 cents gross and 17 cents net per mile. The coal tonnage of the St. Louis Division was 211,075 tons; Kentucky Division, 123,436, both showing a considerable gain.

The earnings for the entire line were as follows:

	1876-77.	1875-76	Inc. or Dec.	P. c.
Passengers	$330,784.76	$341,603.38	D. $10,818.62	3.2
Freight	722,050.01	709,351.27	I. 12,698.74	1.8
Express and mail	41,676.09	45,685.33	D. 4,009.24	8.8
Miscellaneous	5,928.01	14,783.22	D. 8,855.21	59.9
Total	$1,100,438.87	$1,111,423.20	D. $10,984.33	1.0
Expenses	846,756.85	877,416.91	D. 30,660.00	3.5
Net earnings	$253,682.02	$234,006.29	I. $19,675.73	8.4
Gross earn. per mile	3,099.83	3,130.77	D. 30.94	1.0
Net earn. per mile	714.60	659.17	I. 55.43	8.4
Per cent. of expenses	77	79	D. 2	2.5

The business was divided as follows:

	St. Louis Div.	Kentucky Div.	Tenn. Div.
Train mileage	656,922	386,615	182,062
Passengers carried	166,115	64,309	30,114
Tonnage mileage	13,869,548	11,475,048	4,867,799
Gross earnings	$615,314.27	$329,249.94	$155,874.66
Expenses	450,613.70	273,300.38	122,842.77
Net earnings	$164,700.57	$55,949.56	$33,031.89
Gross earn. per mile	2,930.07	3,359.69	3,316.48
Ner earn. per mile	784.29	570.91	702.81
Per cent. of expenses	73	83	79

While the other divisions exceeded the St. Louis in comparative bulk of traffic and amount of gross earnings, yet the St. Louis Division furnished more than its share of net earnings. This arises partly from the fact that it is the most cheaply worked, owing to its better grades. The Kentucky and Tennessee divisions both have heavy grades, and the former was very imperfectly built originally, making heavy repairs necessary.

From net earnings $39,905.03 was paid for new equipment and improvements, and $37,303.94 for back taxes, interest and legal expenses.

Full renewals of track and bridges were made. On a large part of the road the iron first laid is now nearly worn out and renewals will have to be extensively made for several years to come.

The report speaks at length of the discriminations against this road made by the lines south of Nashville, which have refused to take business from it at through rates.

The tables accompanying the report give in very complete form the business of the road and its property and condition.

Boston & New York Air Line.

This company, successor through foreclosure to the New Haven, Middletown & Willimantic, own a line 50 miles long from Cedar Hill Junction, in New Haven, Conn., to Willimantic. It uses the New York, New Haven & Hartford track from Cedar Hill Junction into New Haven, 2½ miles. It leases the Colchester road, a branch 3½ miles long, to Colchester, which was completed in October, 1877. The present report is for the year ending April 30, 1878.

The earnings for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Passengers	$101,300.83	.....	.....	....
Freight	148,738.17	.....	.....	....
Other sources	15,886.70	.....	.....	....
Total	$265,925.70	$174,355.44	I. $91,570.26	52.5
Expenses	188,443.22	126,752.58	I. 61,690.64	48.7
Net earnings	$77,482.48	$47,602.86	I. $29,879.62	62.8
Gross earn. per mile	5,138.66	3,487.11	I. 1,651.55	47.4
Net " "	1,497.25	952.06	I. 545.19	57.5
Per cent. of exps	70.86	72.70	D. 1.84	2.5

The increase in earnings was due chiefly to the development of the through freight business betweeen Boston and New York by this route. The profit on this business is small, but its bulk is considerable and it promises to be of much advantage to the company. The expenses continued large, owing to unusual repairs necessary for equipment, partly also to the nature of the road, and largely to the high charges paid for the use of the New York, New Haven & Hartford track from Cedar Hill Junction to the depot and docks in New Haven. Some of these tolls have been paid under protest, and an effort will be made to recover them.

The road was in a very incomplete state when taken by the present company, and up to June 1, 1877, it had expended $266,718.24 in improvements and $119,296.41 for equipment. During the past year 300 tons of steel rails were laid, shops built at Cedar Hill, and, under instructions from the Railroad Commissioners, work was begun filling in Wolf Brook trestle and building new piers for Black Ledge Crossing bridge.

The Colchester road was completed in October, and leased for 999 years, the company receiving $25,000 first-mortgage bonds in return for iron furnished.

Estimates have been made for putting the road in complete order. They require $125,000 for improvement of grades, $100,000 for steel rails and $75,000 for an extension to tidewater in New Haven, $300,000 in all. The board suggests that an issue of $200,000 income bonds might be made for these purposes, $20,000 to be retired each year. These payments could be made from the earnings of the road, and the work done at once, instead of spreading it over several years.

Nashua & Lowell.

This company owns a line from Lowell, Mass., to Nashua, N. H., 14.5 miles, all double track; it leases the Stony Brook road, from Chelmsford, Mass., to Ayer Junction, 15.5 miles; the Wilton road, from Nashua to Wilton, 13 miles, and the Peterboro road, from Wilton to Greenfield, 10.5 miles, making 53.5 miles in all. The road is worked under a pooling contract with the Boston & Lowell, by which both roads are worked together, and the net earnings divided in the proportion of 69 per cent. to the Boston & Lowell, and 31 per cent. to the Nashua & Lowell. The 43d annual report is for the year ending March 31, 1878.

The balance sheet is as follows:

Stock ($55,172 per mile)		$800,000.00
Gold bonds ($13,793 per mile)		200,000.00
Notes payable		260,000.00
Unclaimed dividends		1,021.00
May dividend		16,000.00
Cashier joint roads		19,275.64
Contingent fund		89,213.46
Total		$1,385,510.10
Road, etc. ($66,200 per mile)	$959,900.80	
Joint accounts, materials, etc	291,506.29	
Notes receivable, advances to leased lines	113,500.00	
Cash	20,603.01	
		1,385,510.10

During the year advances of $20,000 were made to aid the completion of the Manchester & Keene road from Greenfield to Hancock, and $40,000 more is to be loaned. The advances are secured by a mortgage on the road and a lease which is to run until all advances are repaid.

The earnings were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Passenger	$223,781.64	$227,100.73	D. $3,319.09	1.5
Freight	265,390.25	265,307.53	I. 82.72	....
Mail, express, etc	15,884.84	14,636.87	I. 1,247.97	8.5
Total	$505,056.73	$507,045.13	D. $1,988.40	0.4
Expenses	339,911.46	361,726.49	D. 21,815.03	6.0
Net earnings	$165,145.27	$145,318.64	I. $19,826.63	13.6
Gross earn. per mile	9,440.31	9,477.48	D. 37.17	0.4
Net " "	3,086.83	2,716.24	I. 370.59	13.6
Per cent. of exps	67.30	71.34	D. 4.04	5.7

The income account is as follows:

Net earnings		$165,145.27
Proportion of joint rental account		86,927.66
Net balance		$78,217.61
Rents		1,917.38
Boston & Lowell on account of error in taxes		16,624.91
Total		$96,759.90
Interest	$22,404.82	
Wilton R. R. rent	13,530.00	
Taxes and insurance	2,125.56	
Miscellaneous accounts	10,441.04	
Dividends, 4 per cent	32,000.00	
		80,501.42
Balance to contingent account		$16,258.48

The report is chiefly taken up with a discussion of the contract with the Boston & Lowell. In 1872, the directors then in office authorized the joint manager to deduct from earnings before division 7 per cent. interest on the cost of the depot in Boston and the Mystic River Branch and wharves. This the present board holds to have been an unauthorized change in the contract. The contract itself will expire by limitation Oct. 1, 1878, and all negotiations so far for a renewal have failed. The Boston & Lowell demands 76 per cent. of the receipts, which the Nashua & Lowell is not willing to concede, believing that its property furnishes more than one-fourth of the net earnings.